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Exotic Poisons and Resurrected Donkeys: Charles Waterton and Physiological Experiments with Curare in Early Nineteenth-Century England

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Abstract

This paper describes investigations into the South American arrow poison curare in the early nineteenth century. The experimental work of the naturalist and explorer Charles Waterton furnishes a powerful example of how colonial issues, racist stereotypes, experimental practices and exchange of knowledge converged in the scientific investigation of curare. Waterton's attempt to save poisoned laboratory animals through artificial respiration, and his struggle to find medical applications of curare, illustrate the gradual transformation of this poison from a tool of the devil into a substance which may save life; a transformation that accompanied the journey of curare from the rain forest to European laboratories.

Astratto

Questo articolo si propone di analizzare l'indagine scientifica attorno al curaro agli albori del diciannovesimo secolo. Gli esperimenti del naturalista Charles Waterton offrono un esempio particolarmente illustrativo di come la ricerca sul curaro abbia incorporato, nel corso dei secoli, temi variegati legati all'impresa coloniale in America Meridionale, a stereotipi razziali e a intensi scambi di conoscenza e di materiali tra scienziati europei. I tentativi di Waterton di utilizzare la respirazione artificiale per salvare la vita ad animali da laboratorio avvelenati con il curaro, uniti alle sue ricerche su possibili applicazioni mediche di questo veleno, illustrano la progressiva trasformazione da sostanza ritenuta diabolica a possibile rimedio contro gravi malattie.

Introduction

On 20 February 1839 a curious epitaph was published on the last page of the newspaper *St James's Chronicle*: 'Poor Wouralia breathed her last on Saturday morning, the 15th of February, 1839. [...] Wouralia has been of use to science; for on her it has been proved that there is one remedy-and perhaps only one-for wounds received from the poisoned arrows of the Indians'.[1] Wouralia was a twenty-eight-year-old female donkey, whose name had been derived from 'wourali', one of the terms under which the South American arrow poison today called curare was known. She had spent the last twenty-five years of her life on an estate belonging to the Duke of Northumberland, pampered and free from work. The Duke had taken pity on her as she had been involved in a series of quite crude toxicological experiments at the age of three. These experiments had resulted in significant physiological and medical consequences which lately had contributed to the donkey's fame. Wouralia's unusual story offers a privileged point of view in the investigation of a small portion of curare's long history and its peculiar transformations from a hunting tool used by indigenous peoples in the Amazons, to an object of experimental investigation within European laboratories, and on to an applicable and useful medicinal substance.

This shift of roles and geographic locations from the rain forest to European laboratories also involved major changes in the narrative concerning the poison. The sixteenth and seventeenth-century travel accounts from South America, written mostly by missionaries or explorers, can be seen as characterized by that feeling which a number of scholars has described as 'marvellous' or 'wonder',[2] a feeling which originated within the encounter with a truly 'New World', perceived as a cluster of prodigies, miracles and monsters. The European scientists of the eighteenth and early nineteenth century, on the other hand, insisted on the necessity of banning the passion of wonder from their scientific works, in order to 'bring light' on the topic of curare and dispel the so-called myths and superstitions. However, as the story of Wouralia will show, the old rhetoric of the marvellous was substituted not only by exact and

Figure 1: *Charles Marie de La Condamine, 1701-1774 (Source: Wikipedia. Painting by Louis Carrogis Carmontelle, 1760)*

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careful observations, detailed and painstaking experimental efforts, but also by a new sort of mythology dealing with life and death, so that the enchantment surrounding the exotic poison never truly disappeared.

Curare, wonders and the Royal Society

The word 'curare' itself is quite ambiguous and can be defined as a generic term which in the course of its history has been indiscriminately applied to many South American arrow poisons. In more recent years there has been acceptance that curare is a substance derived mainly from some kinds of lianas (climbing vines found throughout tropical rainforests) belonging to the genus *Strychnos*. It has been used in different regions of the Amazon with slightly different compositions to chase birds and small mammals and caused the animals to die through muscle paralysis.[3] In the reports from South America from the sixteenth up to the early twentieth centuries the same substance has been called by a huge variety of names, among them woorara, wourary, ticunas, uirary, uirariry and curuiry.[4]There have been also different hypotheses about the origins and meanings of these names: amongst others the etymologies of 'black liquid', 'mixed with water' or 'bird killer' have been suggested, but none of them has been univocally accepted.[5] When one of these names appears in a travel account from the sixteenth or seventeenth century, sometimes even beyond, it is not always possible to ascertain if the described arrow-poison was a 'true curare' or something completely different.[6]

Probably the first scientist who brought some curare samples to Europe was the French mathematician and naturalist Charles Marie de La Condamine (1701-1774), who led a voyage of scientific discovery to South America under the patronage of the Paris Académie des Sciences. La Condamine performed some well-known experiments with curare at the University of Leiden in 1745. Renowned scholars including Gerard Van Swieten (1700-1772), Pieter van Musschenbrook (1692-1761) and Bernhard Siegfried Albinus (1697-1770) acted as witnesses. Starting with La Condamine's travel account it became a recurring theme in every report about curare to accuse the previous literature of consisting of myths, legends, fantastic details and gross errors. Furthermore, almost every author from La Condamine onwards stressed that his own account would be an attempt to 'spread light' on the matter and to debunk a number of errors that had been propagated for too long.

One of the major obstacles related to the experimental investigation of curare in the eighteenth century was the persistent difficulty in having access to this and other exotic substances. Soon after La Condamine's experiments in Leyden, samples of his curare reached the Royal Society in London. Historical sources are not sufficient to determine how and when this happened, nor if it was really La Condamine who furnished the poison, or rather one of his two travel companions, Antonio de Ulloa and Pedro Maldonado.[7] A number of coincidences, however, determined that most of the experiments which were carried out on the curare up to the early nineteenth century took place in the circle of the Royal Society of London, so that a sort of 'curare network' emerged around the Society, involving a wide exchange of knowledge and material.

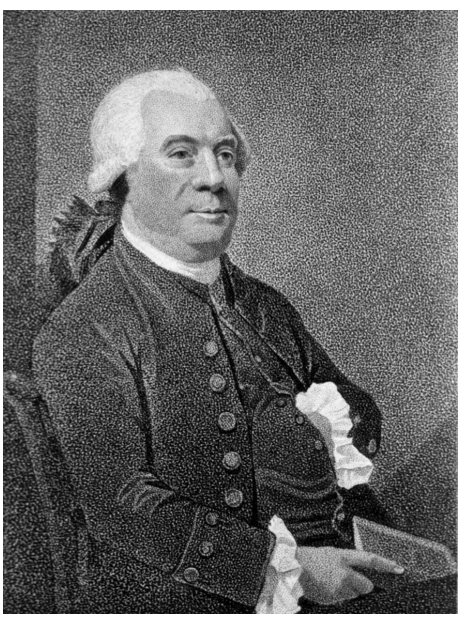

Figure 2: *Richard Brocklesby, 1722*
(Source: Wikipedia. Painting by artist unknown)

A powerful rhetoric of 'enlightenment' emerged particularly around the Royal Society and in the articles on curare that were published in the Society's *Philosophical Transactions*. One remarkable example is this passage by Richard Brocklesby (1722-1797),[8] who carried out some investigations on curare in 1746 and published a brief article that contributed to his election as a fellow of the Royal Society in 1747:

> The Subjects of Natural History are often strange and uncommon; but the Authors who have treated on them have not failed, on their Parts, to support and raise the Wonder, and once conceived Astonishment, by ascribing Properties which never existed in Nature; thus indulging the Humour of finding a Marvellous in all Things, Truths have been greatly obscured, and Errors propagated without Number.[9]

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Brocklesby did not deny that some natural phenomena could cause a feeling of wonder and amazement, but he argued that these phenomena had no ontological status separate from their common ones. Natural philosophers like Brocklesby, at the middle of the eighteenth century, criticized the taste for curiosity – still common at their time even among 'enlightened' naturalists – as a childish passion, not suitable to men of science.[10] Curiosities and wonders had to be 'normalized', i.e. uncommon objects and substances had to be analysed through experimental investigation, without indulging in pleasure for the exotic and marvellous, substituting the imaginative with the rational.

Brocklesby advocated the urgent necessity to exorcise feelings of wonder and admiration towards uncommon and bizarre items such as curare, a thought which had a parallel in the contemporary changes in scientific collectionism and the widespread criticism of the cabinets of curiosities, the so-called 'wunderkammer'.[11] In the field of toxicology, Brocklesby attributed 'the prodigious multiplicity of poisons, and that equally numerous tribe of antidotes'[12] to the same 'love for prodigy and wonder',[13] and recommended modern authors of materia medica to be 'just to Truth'.[14] At the same time Brocklesby himself and later authors who shared his opinion on this subject continued to use powerful metaphors to describe the curare, referring often to its terrible power and extraordinary swiftness in killing.

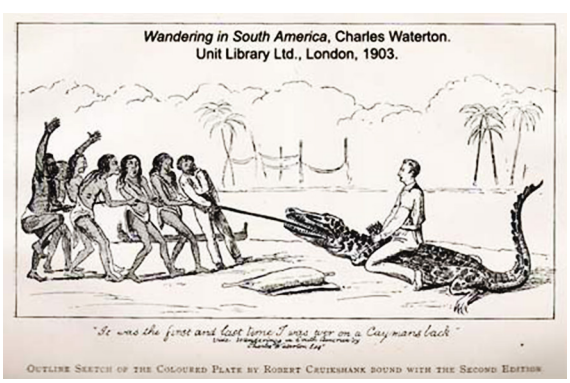

Figure 3: *Illustration from Wandering in South America by Charles Waterton*
(Source: Unit Library 1903)

Beside the persistence of stereotypes about exotic poisons and the longstanding narrative about the necessity of bringing light into the topic, from the mid-eighteenth century we find increasing attempts to control and dominate the narrative concerning curare. This is achieved through the individuation of its chemical and botanical characteristics, the understanding of its action on the organism, and later through attempts to make use of it either as a heuristic tool to study organic processes or as a medicine.[15]

Aside from Brocklesby, other scientists who were interested in curare who may be taken as examples of this process are David François Herissant (1714-1773), Edward Bancroft (1744-1821), Felice Fontana (1730-1805), Alexander von Humboldt (1759-1869) and Benjamin Brodie (1783-1862). Except for Humboldt, all the other scientists were connected to the Royal Society of London and published their results in the *Philosophical Transactions*. I will now present the experiments of the adventurer, naturalist and virtuoso Charles Waterton (1782-1865), whose travel account *Wanderings in South America* (1825)[16] gained great popularity throughout the nineteenth century and whose trials on curare awakened the interest of a number of physiologists and physicians.[17]

Figure 4: *Stonyhurst College, Clitheroe, Lancashire, 1871 (Source: Illustrated London News)*

Waterton's *Wanderings in South America*

Waterton was born on 3 June 1782 in Walton Hall, an estate near Wakefield in Yorkshire, England. Many anecdotes refer to the time of his education at Stonyhurst College in Lancashire as a time in which the young Charles Waterton showed a great dislike for discipline but a vivid interest in natural phenomena.[18] In general, Waterton's biography is full of colourful stories, not all of which are authentic, which characterize him not only as an archetypal aristocratic eccentric, but also as a virtuoso of science and art.

In the late 1790s his father had invested in some sugar plantations in Demerara, a region in the Guianas on the north coast of South America which is now part of Guyana. Until 1815 it was a Dutch colony, becoming part of British Guiana between 1838 and 1966. In 1804 Waterton was sent to visit and help administer the family estates.[19] He was happy with his father's decision, not because he was particularly interested in the plantations but because of the numerous subjects of natural

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philosophy which he could investigate in South America.

Waterton's uncle was then a close friend of the naturalist and botanist Sir Joseph Banks (1743-1820) who was president of the Royal Society, a position he held for over 41 years. Banks had taken part in numerous expeditions to Africa, South America and Australia; he made his name on the 1766 expedition to Newfoundland and Labrador, and was later appointed to James Cook's first voyage (1768–1771) as the official botanist, visiting Brazil, Tahiti and New Zealand, amongst others. Just a few days before Waterton's departure he was invited to lunch by Banks. The latter, having himself travelled across South America and having heard about the curare in London, asked Waterton to collect some samples of the poison, and to enquire if the poison was really as powerful as it was commonly believed to be.

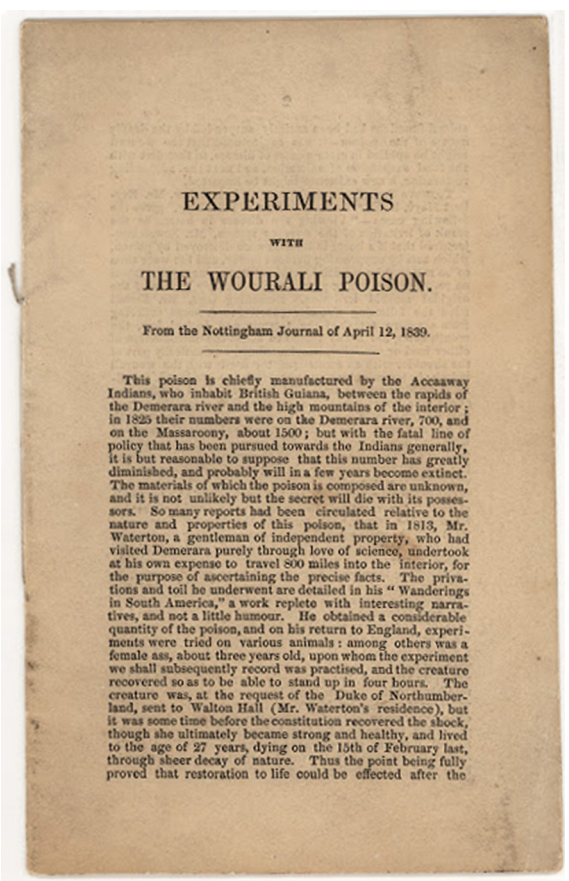
Waterton sailed from Portsmouth at the end of November 1804 and landed at Stabroek, in what was then Dutch-owned Surinam. It was not until 1812 that he made an attempt to find and investigate curare. At that time he travelled to the Macushi Indians in the south of Guyana in an attempt to obtain samples of their poison. The Macushi curare was well known as one of the most potent in the whole region, as Waterton wrote in his travel account:

> Though the wourali poison is used by all the South American savages between the Amazons and the Oroonoque, still this tribe makes it stronger than any of the rest. The Indians in the vicinity of the Rio Negro are aware of this, and come to the Macoushi County to purchase it.[20]

Like many other European travellers before and after him Waterton did not trust the reports which had been written before his own, since 'their stories tend more and more to darken the little light that existed on this topic'.[21] Waterton's opinion of the native people of the New World was not different than the one of most of his contemporaries; he not only labelled them as 'primitive, ignorant and uncivilized' but he was also convinced that none of their stories could be trusted:

> They will, every one of them, tell you that there is a nation of Indians with long tails; that they are very malicious, cruel and ill-natured; and that the Portuguese have been obliged to stop them off in a certain river to prevent their depredations. They have also dreadful stories concerning a horrible beast called the water-mamma which, when it happens to take a spite against a canoe, rises out of the river and in the most unrelenting manner possible carries both canoe and Indians down to the bottom with it, and there destroys them. Ludicrous extravagances! Pleasing to those fond of the marvellous, and excellent matter for a distempered brain.[22]

As he was opposed to these stories he promised to the reader 'a precise, unadorned account of the wourali poison' in which he would report only the 'truths' which he would witness with his own eyes.[23] Despite this assurance Waterton did not manage to observe the preparation of curare, which he defined as a 'gloomy and mysterious operation.'[24] He reported that a young Macushi, who had promised to show him how to prepare the poison, later reneged on his pledge with the excuse that his wife was pregnant and the operation could have possibly harmed his unborn child. According to Waterton Macushi women were not allowed to take part in the preparation of curare as they believed in the presence of a demon called Yabahou who would decrease their fertility.



EXPERIMENTS

WITH

THE WOURALI POISON.

From the Nottingham Journal of April 12, 1839.

This poison is chiefly manufactured by the Accaaway Indians, who inhabit British Guiana, between the rapids of the Demerara river and the high mountains of the interior; in 1825 their numbers were on the Demerara river, 700, and on the Massaroony, about 1500; but with the fatal line of policy that has been pursued towards the Indians generally, it is but reasonable to suppose that this number has greatly diminished, and probably will in a few years become extinct. The materials of which the poison is composed are unknown, and it is not unlikely but the secret will die with its possessors. So many reports had been circulated relative to the nature and properties of this poison, that in 1813, Mr. Waterton, a gentleman of independent property, who had visited Demerara purely through love of science, undertook at his own expense to travel 800 miles into the interior, for the purpose of ascertaining the precise facts. The privations and toil he underwent are detailed in his "Wanderings in South America," a work replete with interesting narratives, and not a little humour. He obtained a considerable quantity of the poison, and on his return to England, experiments were tried on various animals: among others was a female ass, about three years old, upon whom the experiment we shall subsequently record was practised, and the creature recovered so as to be able to stand up in four hours. The creature was, at the request of the Duke of Northumberland, sent to Walton Hall (Mr. Waterton's residence), but it was some time before the constitution recovered the shock, though she ultimately became strong and healthy, and lived to the age of 27 years, dying on the 15th of February last, through sheer decay of nature. Thus the point being fully proved that restoration to life could be effected after the

Figure 5: *Page from Experiments with Wourali Poison, 1839 by Charles Waterton*
(Source: Wakefield Museums and Libraries)

Even men had to observe specific rituals before attending to the preparation of the poison. These includ-

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ed ritual ablutions and fasting along with more practical precautions like covering the mouth and nose and avoiding touching the poison with bare hands. Waterton described the Macushi's cultural practices in a very precise way, explaining them in terms of ignorance and backwardness. 'You know superstition to be the offspring of ignorance and of course that it takes up its abode among the rudest tribes of uncivilized men.'[25] Despite this, since he could not witness the operation of cooking the curare himself, he had to compile this part of his account based on information he obtained from the Macushi people, which he had previously dismissed as not trustworthy.

The main characteristics of curare were observed and described in the fashion of natural history by indicating its perceptible properties such as colour, taste, smell, acidity, alkalinity, solubility. Above all, Waterton was interested in the ingredients used to prepare the poison. In his opinion only certain plants (specifically 'a vine' and 'a root of very bitter taste',[26] which he did not attempt to identify) constituted the active principles of the poison, while other superfluous components, such as red pepper or fangs of poisonous snakes, were added just out of superstition. On the other hand he admitted that even 'enlightened people' could make the mistake of adding superfluous ingredients to their medicines, so how could you expect something else from the 'wild, untaught, unenlightened savage of Guiana'?[27]

This claim was not novel in the history of curare. Other authors before Waterton drew a parallel between the numerous, useless ingredients of American arrow poisons and some equally futile ingredients added to simple medicines by European pharmacists. Charles Marie de La Condamine and Edward Bancroft, for example, had compared the preparation of curare to that of theriac;[28] and Brocklesby, referring to the many components of the curare, had praised those modern European pharmacists who were reforming the materia medica by simplifying the preparation of medicines.[29]

Waterton's physiological experiments

Waterton's first physiological experiments took place directly in the rain forest of Guyana about 1812. He did not describe them accurately; he simply stated that birds and small mammals were gradually paralyzed and that the curare 'manifests itself by an apparent unwillingness of the bird to move.'[30] After killing an ox by using an arrow which had been poisoned with liquid curare Waterton wrote that the required dose to kill such a big animal had to be much larger than the one usually employed to kill birds. Like other British scientists before him Waterton devoted some words to the fate of laboratory animals, saying that 'it makes a pity heart ache to see a poor creature in distress and pain.' He assured his readers that he would never have carried on such cruel experiments if it would not have been for a more important goal, the progress of knowledge and benefit of humanity.[31]

Waterton returned to England in the spring of 1813 and reported on a meeting he had had with a gentleman who wished to kill a donkey without damaging the skin, in order to display the animal in his cabinet of natural history. Waterton suggested killing the donkey using an arrow that had been coated with curare, a method that had already been used more than half a century before for some specimens in Reaumur's cabinet of natural history.[32] Waterton gave a colourful description of the symptoms, but not without expressing his pity for the animal. The physiological action of curare was described in a quite anthropomorphic way as an intentional function, a battle between the strong constitution of the animal and the subtle poison which destroyed its life, 'so that it may be said, on seeing a mortally-wounded sloth, that life disputes with death every inch of flesh in its body.'[33]

However even Waterton, like almost all of his contemporaries, believed that the curare would kill without pain and 'destroy life's action so gently' that the animals would die 'without the least apparent contention, without a cry, without a struggle and without a groan'.[34] The belief that death through curare was a painless one had taken foot in the scientific community starting from the middle of the eighteenth century. Older travel accounts, which usually described the action of curare as very painful, a direct product of the cruelty and

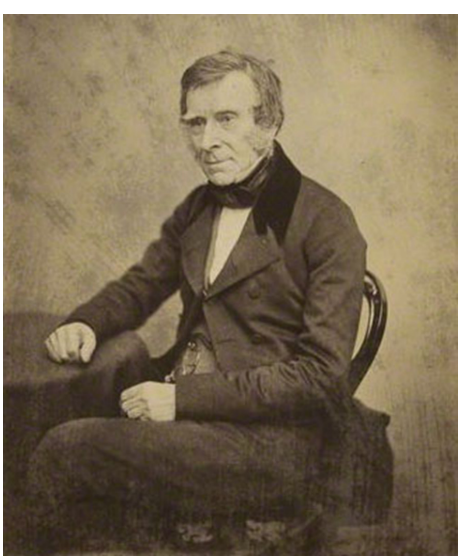

Figure 6: *Sir Benjamin Collins Brodie, 1783-1862 (Source: Wikipedia. Photograph by unknown photographer)*

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barbarism of American indigenous people, were dismissed as a product of excessive imagination or, once again, as something that aimed at exciting wonder and curiosity. This belief persisted well into the nineteenth century; François Magendie (1783-1855) for example often used curare to immobilise animals for his physiological experiments, believing that the substance would anesthetize them. As is well known, Claude Bernard (1813-1878) debunked this belief in his famous works on curare.[35]

Benjamin Brodie and curare's practical applications

Most scientists who had performed experiments with curare before Waterton were looking for a possible explanation of its physiological action, mostly by trying to localize its effects on a particular organ. Waterton's account however is deliberately free from hypotheses about the physiological action of the poison on the organism, as he was more interested in finding a possible remedy against its effects. An opportunity to research into this matter was offered by Sir Joseph Banks, who had aroused his curiosity for curare some years before. During 1814 Waterton contacted Banks and reported his experience with the curare in South America and his recent experiments in England. Banks, who was also a member of the Veterinary College, London (opened in 1792 and renamed Royal Veterinary College in 1826), had already carried out some experiments on curare together with Sir Benjamin Collins Brodie. Brodie was another member of the Royal Society who had researched curare's physiological action in recent years, and whose results had been published in the article 'Experiments and Observations on the different Modes in which Death is produced by certain vegetable Poisons' (1811).[36]

Brodie's enquiry into the curare was far more accurate than that of Waterton. His research was guided by a well articulated experimental theory with important physiological consequences and medical implications. In the first place Brodie had aimed at determining the organs on which the poison exercised its primary influence. This kind of anatomical and morphological research was shared by the other authors who had investigated the action of curare before him. They too had tried to localise its effects on different organs, for example on the blood or the nerves. Despite this common feature Brodie's methodology involved some very important novelties, above all the question concerning 'through what medium that organ becomes affected',[37] i.e. which part or system within the organism transmitted the toxic action of the curare.

Brodie formulated some interesting hypotheses about the physiological action of the poison which were considerably influenced by Xavier Bichat's (1771-1802) medical theories, especially the one proposed in the book *Recherches physiologiques sur la vie et la mort* (1800). Interpreting his own experiments in the light of Bichat's organic theories Brodie had reached the conclusion that the curare primarily affects the brain through the medium of the blood. Brodie believed (once again following Bichat) that sudden death could have been caused only by serious damage to one of three organs; the heart, the lungs or the brain. So he thought that if the life of a curarized animal could have been saved through artificial respiration, which meant keeping up the function of the heart and the lungs, it would have proved that the poison acted primarily on the brain.

Brodie confirmed his hypothesis by saving the life of a curarized cat by inflating her lungs with bellows through a tracheotomy, until the paralysis caused by the poison was over and the animal was able to breathe again. The cat was given the name Woory, another variation of the word woorara, and reached a certain popularity; she is mentioned for example in a letter written by Maria Edgeworth, a prolific Anglo-Irish writer of adult and children's literature.[38] Brodie's interest in artificial respiration was essentially a theoretical one, an experimental device to prove his (and Bichat's) physiological theories. Nevertheless, Banks saw in this device primarily a possibility to develop new practical applications for curare.

Waterton and the donkey experiments

In 1814 Banks, Brodie and William Sewell, the director of the London Veterinary College, asked Waterton to bring some poisoned arrows to the college and join them in a new series of experiments. While Brodie was interested in studying further physiological implications of the action of vegetable poisons on the organism Waterton aimed at improving the technique of tracheotomy and artificial respiration which, although already tried by Brodie, was still a novelty in the history of curare. Banks and Sewell, on their side, were looking for possible applications of the curare in the therapy of tetanus and hydrophobia.

Waterton chose three donkeys for their experiments, since he believed them to be more resistant than smaller animals such as cats or rabbits, and therefore more likely to survive if their lungs were inflated long enough. The first two donkeys were used to estimate the time needed by the poison to reach general circulation and become active, by using ligatures and tourniquets. The third animal, the then three-years-old Wouralia, 'died apparently' ten minutes after the curare was inoculated in her shoulder. Waterton and Bro-

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die made an incision in her windpipe and inflated her lungs using common bellows. After two hours she lifted her head for some seconds but then fell down again. After two more hours of artificial respiration she regained consciousness but remained very weak for more than one year. Only in the summer of 1815 did she regain her health and become 'fat and frisky.'[39] Waterton concluded Wouralia's story by reassuring the reader that:

> Earl Percy, pitying her misfortunes, sent her down from London to Walton Hall, near Wakefield. There she goes by the name of Wouralia. Wouralia shall be sheltered from the wintry storm; and when the summer comes she shall feed in the finest pasture. No burden shall be placed on her and she shall end her days in peace.[40]

The four scientists published the results of their experiments together. They all considered the experiments to represent a breakthrough not only concerning curare but also and primarily in treating cases of hydrophobia and tetanus. In the same article in which Wouralia's death was announced Waterton declared his willingness to try to cure through curare any animal affected by hydrophobia. Besides:

> ... should one of our own species labour under a confirmed locked jaw, or go mad from the bite of a rabid animal, Mr Waterton would be prepared to perform the operation in person, provided the attending medical gentlemen declare that they have it not in their power to administer relief, and that they consider the case of the patient to be utterly hopeless.[41]

On 5 February 1839 Waterton's remedy was taken into consideration for the first time. A Nottingham police inspector named Isaac Phelps was bitten by a dog. The wound healed well but after seven weeks he was hospitalized and diagnosed with hydrophobia. A doctor named Francis Sibson had read an account of Waterton's experiments and sent him a letter, asking him to bring some curare to the hospital to attempt to save Phelps' life.[42] Waterton came too late and found Phelps already dead. Nonetheless Sibson asked him to demonstrate his experiences with the curare and the artificial respiration in front of other doctors of Nottingham General Hospital.

Waterton's previous experiments with Wouralia had generated great interest in scientific circles and produced repercussions among physicians and the merely curious. For that reason the new experiments in Nottingham were attended by a great number of medical

Figure 7: *Charles Waterton, 1782-1865*
(Source: Wikipedia. Painting by artist unknown)

doctors as well as curious gentlemen. A Dr Davidson who assisted Waterton with the experiments suggested using a combination of curare and strychnine, but the donkey on which the mixture was tried did not survive. After these last experiments, Waterton donated most of his arrows and curare samples to other scientists and to his old school in Stonyhurst. Those that were conserved in his school were later transferred to Wakefield City Museum, where they are today.

Further experiments with curare in the treatment of tetanus were performed by George Harley (1829-1896) using some samples which had been given to him by Waterton during a visit to Walton Hall.[43] In 1859 Harley described the use of curare on a horse suffering from tetanus[44] and further discussed the topic in his correspondence with Waterton.[45] Harley also suggested using strychnine as an antidote for curare, and, vice versa, the use of curare in cases of strychnine poisoning.

Figure 8: *Walton Hall, Wakefield, West Yorkshire, c.1780*
(Source: Overtown Miscellany, John S. Sargent, 1997)

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Waterton, curare, and life and death

Waterton's fame in the history of curare is mostly due to the wide circulation of his travel account, as well as to the excitement about Wouralia's reanimation and to Waterton's contribution in the development of the technique of artificial respiration. Although he did not formulate any physiological or toxicological theory, the analysis of his work introduces two theoretical issues, which were briefly described at the beginning of this contribution.

The first issue regards the problematic question on the border between apparent death and 'true death' in the early nineteenth century. In a broader sense this is a question on the boundary between life and death; this topic has already been analysed in the fields of history of science and literature, but may suggest further research if related to poisons. Before Waterton's work Brodie had investigated curare using Bichat's theories about life and death.[46] The British scientist had further discussed these concepts when he applied artificial respiration to curarized animals. Waterton developed and improved this technique and was, like Brodie, attracted by the problematic zone between life and death. He knew curare was a deadly poison, but the artificial respiration that here appeared almost as a Promethean act could bring the (apparently) dead back to life.

This topic has been partially discussed by Stephen Bann in his book *Frankenstein, Creation and Monstrosity* (1994) which deals with the ideas of creation and monstrosity intertwined in the British culture of the early nineteenth century. Bann analyzed Waterton's 'miracle' of resurrecting Wouralia, and drew an interesting parallel with his activity as a taxidermist. It was about this particular activity that Waterton wrote: 'in a world, you must possess Promethean boldness, and bring down fire, and animation, as it were, into your preserved specimen.'[47] A good taxidermist, according to Waterton, should not only give his preserved animals the appearance of life; he should literally bring the flame of life into them. Well versed in Latin and Ancient Greek literature as a result of his education in a Jesuit school he considered Ovid's *Metamorphoses* the main source of myths about death and resurrection. He chose the words of the Roman poet to describe his efforts: 'Mox similes volucri, mox vera volucris';[48] soon it looks like a bird, soon it *is* a bird.

So the previous myths about curare, which, according to Waterton had to be dispelled, were substituted by other forms of mythology involving life and death. This shift testifies to the lasting fascination with this exotic poison that did not cease with Waterton but continued also in later scientists. Even Claude Bernard found that, when the subject of enquiry was curare, 'scientific truths (...) are not less marvellous than the romantic creations of our imagination.'[49]

The second point of discussion which emerges from this review of the history of curare concerns the possibility of using the poison and its induced paralysis in the therapy of some particular illnesses which caused spasms and convulsions. This opportunity became apparent in the moment in which physicians learned how to neutralize, or at least to reduce, the danger resulting from the substance itself using artificial respiration. Actually, hypotheses about possible benefits of possessing curare were already present in early travel accounts from the sixteenth, seventeenth and early eighteenth centuries. Although their authors often saw American arrow poisons as weapons of primitive and barbaric peoples, sometimes even as an instrument of the devil, some of them speculated about the possibility of using the poisons in their own colonial wars, especially against the Amerindians themselves.

The Europeans, so they claimed, had the advantage of superior chemical and pharmaceutical knowledge, which could have turned primitive poisons into more fatal weapons. So thought for example the Spanish Jesuit Jose' Gumilla (1686-1750) author of a book on the natural history of the Orinoco River region *El Orinoco ilustrado y defendido* (1731).[50] Gumilla described curare as a product of the devil, endowed with occulted malignity, a gift of Satan to the barbarian people of Venezuela. On the other hand, Gumilla was convinced of the benefits of appropriating Amerindian knowledge and refining it in European laboratories, through the new discoveries of chemistry.[51]

Conclusion

Speculations about a belligerent use of curare ceased at the beginning of the eighteenth century, making way to the search for medicinal applications at the beginning of the nineteenth century. This happened at the same time as the trade of medicinal substances from the New World increased as well as the attempts to isolate active alkaloids from exotic drugs.[52] Waterton's contempt for South America's native people did not differ much from the one expressed by Gumilla.[53] Their land and plants were still seen as belonging to nobody, and hence were free to be pursued by European voyagers.

At the same time the poisons of the native people were no longer seen as instruments of the devil against mankind, as earlier missionaries had preached. Changing their location from the rain forest to the European laboratory such substances could be analysed, investigated and almost subjected to a new creation. Through accurate experiments, correct estimation of the right dosage and surgical intervention, the terrible and dead-

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ly poison could be newly defined as a useful, perhaps life-saving substance.

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Endnotes and references

1. The article was entitled 'The ass Wouralia' and was reprinted by Charles Waterton in his later work *Essays on Natural History*, from which this quote is taken. See Waterton, C. *Essays on natural history, chiefly ornithology. With an autobiography of the author*. London: Longman, 1839, 304-305.

2. On the subject of wonders and the marvellous in travel accounts (mostly referring to the New World) see the classical works: Greenblatt, S. *Marvellous Possessions: The Wonder of the New World*. Chicago: University of Chicago Press, 1992; Daston, L. and Park, K. *Wonders and the Order of Nature*. New York: Zone Books, 1988; Campbell, M.B. *Wonder and Science: Imagining Words in Early Modern Europe*. Ithaca NY: Cornell University Press, 1992.

3. See Louis Lewin's classical work on arrow poisons: Lewin, L. *Die Pfeilgifte. Nach eigenen toxikologischen und ethnologischen Untersuchungen*. Leipzig: Gerstenberg Verlag, 1984, 413-426. See further Bisset, N.G. War and hunting poisons of the New World. Part 1. Notes on the early history of curare. *Journal of Ethnopharmacology*, 1992; 36(1): 1-26.

4. Urari, Uiraêry, Uirari, Ururara, Uirary, Ourary, Urali, Wourari, Worari, Woraru, Wourali, Worali, Woorara, Kurari, Curara and Curaraye are just some of the many different names under which curare was known among different tribes and different authors. See Barbosa Rodriguez, J. *L'uiraêry ou curare*. Brussels: Veuve Monnom, 1903, 3 and McIntyre, A. *Curare. Its History, Nature, and Clinical Use*. Chicago: The University of Chicago Press, 1947: 1.

5. See Barbosa Rodriguez, J. (Note 4). 1903: 3 and Martius, K.F. *Glossaria linguarum Braziliensium*. Erlangen: Junge & Sohn, 1863: 427.

6. Vellard, J. *Historie du curare: Les poisons de chasse en Amerique du Sud*. Gallimard: Paris, 1965 : 13-42.

7. For a full explanation of this little 'mistery', with reference to manuscripts and journal books of the Royal Society, see Micheletti, S. *Experimentalisierung und internationale Kommunikationen: Der Fall Curare*. Stuttgart: Deutscher Apotheker Verlag, 2015.

8. Richard Brocklesby (1722-1797) was educated at Ballitore, in Ireland, where Edmund Burke was one of his school fellows. Later he studied medicine at Edinburgh, and finally graduated at Leiden in 1745, where he probably witnessed La Condamine's experiments with curare, or at least heard about them. His enquiries on curare remained just an isolated episode in his medical and scientific career, and, despite his accurate methodology and some innovative observations, found little resonance in the scientific community and the further history of this poison.

9. Brocklesby, R. A Letter from Richard Brocklesby M. D. and F. R. S. to the President, concerning the Indian Poison, Sent Over from M. de la Condamine, Member of the Royal Academy of Sciences at Paris. *Philosophical Transactions of the Royal Society of London*, 1746; 44: 408-412.

10. Daston and Park describe the attitude towards wonders during the Enlightenment as a fight against an 'unholy trinity' composed of 'enthusiasm, superstition and imagination'. See Daston, L. and Park, K. (Note 2), 1988: 334 ff. According to the authors wonders were stigmatized as 'metaphysically implausible, politically suspect, and aesthetically distasteful', ibid., 20. For a more specific discussion of this topic concerning the Royal Society, see Fontes da Costa, P. The Culture of Curiosity at the Royal Society in the first Half of the eighteenth century. *Notes and Records of the Royal Society of London*. 2002; 52(2): 147-166.

11. See Olmi, G. From the Marvellous to the Commonplace: Notes on Natural History Museums (16th-18th Centuries). In Mazzolini, R. *Non-Verbal Communication in Science Prior to 1900*. Olschki: Florence, 1993: 235-278.

12. Brocklesby, R. (Note 9), 1746: 408.

13. Ibid., 408.

14. Ibid., 408.

15. See Wahrig, B. Zeit des Gifts: Formen der Temporalität in Claude Bernards Arbeiten über Curare. In Schmidgen, H. *Lebendige Zeit: Wissenskulturen im Werden*. Berlin: Kulturverlag Kadmos, 1995: 79-96.

16. The first edition was published in 1825 for the editor J. Mawman in London. Here I quote from the second edition: Waterton, C. *Wanderings in South America, the north-west of the United States, and Antilles.* London: B. Fellows, 1836.

17. For more details about curare in the circle of the Royal Society in the eighteenth and early nineteenth centuries see Micheletti, S. (Note 7), 2015.

18. For biographical data about Charles Waterton see Edginton, BW. *Charles Waterton: A Biography*. Cambridge: Lutterworth Press, 1996.

19. See Birmingham, AT. Waterton and Wouralia, *British Journal of Pharmacology*, 1999; 126: 1685-1689, here 1685.

20. Waterton, C. (Note 16), 1836: 47. Like other authors before him Waterton called the poison Wourali.

21. Ibid., 52.

22. Ibid., 38.

23. Ibid., 53.

24. Ibid., 93.

25. Ibid., 60.

26. Ibid., 61.

27. Ibid., 61.

28. La Condamine, CM. *Relation abrégée d'un voyage fait dans l'intérieur de l'Amérique méridionale. Depuis la côte de la Mer du Sud, jusqu'aux côtes du Brésil & de la Guyane, en descendant la rivière des Amazones. Lue à l'Assemblée publique de l'Académie des Sciences, le 18 avril 1745*. Paris: Pissot, 1745 : 68. Bancroft, E. *An Essay on the Natural History of Guiana and South America. Containing a description of many curious productions in the animal and vegetable systems of that country. Together with an account of the religion, manners, and customs of several tribes of its Indian inhabitants* London: Becket, 1969: 287.

29. Brocklesby, R. (Note 9), 1746: 408.

30. Waterton, C. (Note 16), 1836: 61.

31. Ibid., 61.

32. See Herissant, D.F. Experiments made on a great number of living animals with the poison of Lamas, and of Ticunas, by Mons. Herissant, Doctor of Physic, and F.R.S. Translated from the French by Thomas Stack, M.D. *Philosophical Transactions of the Royal Society of London*, 1751; 47: 75-92, here 90.

33. Waterton, C. (Note 16), 1836: 62.

34. Ibid., 61.

35. See Bernard, C. Études physiologiques sur quelques poisons américains. I. Curare. *Revue des Deux Mondes*. 1864; 53: 164-190.

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36. Brodie, BC. Experiments and Observations on the different Modes in which Death is produced by certain vegetable Poisons. *Philosophical Transactions of the Royal Society of London*, 1811; 101: 178-208.

37. Ibid., 178.

38. Maria Edgeworth narrated that Woory had been poisoned several times 'much to the satisfaction of the phil. spectators, but not quite to the satisfaction of poor puss, who grew very thin and looked so wretched that Dr. Baillie's son, then a boy, took compassion on this poor subject of experiment, and begged Mr. Brodie would let him carry off the cat'. See Edgeworth, M. *The life and letters of Maria Edgeworth*. Teddington: The Echo Library, 2007: 31.

39. Waterton, C. (Note 16), 1836: 92.

40. Ibid., 92-93.

41. Ibid., 305-306.

42. See Birmingham, A.T. (Note 19), 1999: 1687.

43. Edginton, BW. (Note 18), 1996: 187.

44. Harley, G. On the action of woorara. *Lancet*. 1859; 74: 654.

45. Thomas, KB. *Curare: Its History and Usage.* Philadelphia: Lippincott, 1963: 91.

46. Bichat's theories had their origins in Paris at the beginning of the nineteenth century in an environment in which the fascination with death and putrefaction was great, both in medicine and in figurative arts. See Strauss, J. *Human Remains: Medicine, Death, and Desire in Nineteenth-century Paris,* Fordham University Press, 2012. On Bichat and his influence on British physiologists see also Micheletti, S. Life and death appeared to me ideal bounds. Investigations into Life, Death, Resuscitation and 'Vegetable Poisons' in Early Nineteenth-Century Britain. In Klippel, H., Wahrig, B. and Zechner, A. *Poison and Poisoning in Science, Fiction and Cinema: Precarious Identities*. New York/London: Palgrave Macmillan, 2017.

47. Waterton, C. (Note 16), 1836: 92.

48. Ibid. The original Latin text is in Ovid's *Metamorphoses*, Book 13.

49. Bernard, C. (Note 35), 1864: 173.

50. The complete title was *El Orinoco ilustrado y defendido. Historia natural, civil y geográfica de este gran río y de sus caudalosas vertientes.* Several editions in Spanish and French were printed throughout the eighteenth century.

51. 'Si quelque savant botaniste avoit découvert cette racine, & qu'il en eût connu la malignité occulte, on n'en sersit point étonné. Si le fameux Thriteme, ou le célebre Borri, ou quelqu'autre fameux inventeur de la Chimie, à force de raisonnemens & d'expériences, eût trouvé cette composition, il sercit digne de nos éloges'. I quote from the first French edition of Gumilla's book: Gumilla, J. *Historie naturelle, civile et geographique de l'Orenoque et des principales Riviéres qui s'y jettent.* Girard: Avignon, 1758, v. 13, 14. Margaret Ewalt has analysed Gumilla's work and its recurrent motives of wonder and Enlightenment in her book *Peripheral Wonders: Nature, Knowledge, and Enlightenment in the Eighteenth-Century Orinoko*. Cranbury: Associated University Presses, 2008.

52. Morphine was first isolated in 1804 by Friedrich Sertürner as the first natural plant alkaloid. Then followed strychnine (1818), quinine (1820), atropine (1831) and other 'exotic' substances. D-tubocurarine was isolated from crude curare in 1935 by Harold King. In the early 1940s curare was introduced into anaesthesia as a muscle relaxant for surgery.

53. Despite his opinion about Amerindians, in May 1829 Waterton married the seventeen-year-old creole Anne Edmoston, the daughter of a Scottish nobleman and an Arrawauk princess. Anne died less than one year after the marriage while giving birth to their son Edward Waterton. From that moment and for the rest of his life Waterton slept on the floor, using a stone as a pillow. See Edginton, BW. (Note 18), 1996: 86.

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British Pharmacists and the Peking Union Medical College Hospital, 1910-1941

Patrick Chiu

Abstract

Prior to the Sino-Japanese War in 1937 the London Missionary Society played a pioneering role in the westernization of hospital pharmacy in China. The Peking Union Medical College Hospital (PUMCH) was founded with seed funding from the Empress Dowager Cixi of the Qing Dynasty in 1902. With the support of influential western physicians the hospital recruited its first pharmacist, Bernard Read, in 1910. Other British pharmacists including John Cameron made important contributions to the development of pharmacy at PUMCH between 1910 and 1941, and their influence is still apparent through those who practice clinical pharmacy in China today.

摘要(繁體中文)

在1937年的中日戰爭之前，倫敦傳道會在中國醫院藥學西化過程中發揮了開創性的作用。 北京協和醫院（“協和”）於1902年由清代慈禧太后的種子基金資助下成立。在有影響力的西方醫生的支持下，協和於1910年招募了第一位藥劑師，伊博恩(Bernard Read)。在1910年至1941年間，其他英國藥劑師包括康約翰 (John Cameron) 等為協和藥劑科的發展做出了重要貢獻，而他們的影響力在今天中國從事臨床藥學的人士中仍然很明顯。

Introduction

In a report published on 13 November 2016, by the Institute of Hospital Management of Fudan University in Shanghai, the Peking Union Medical College Hospital (PUMCH) was ranked as China's top general hospital for 2015, for the seventh year in a row since 2009.[1] PUMCH is one of China's oldest hospitals, and together with its affiliated medical institute the Peking Union Medical College can trace its origins back to humble beginnings in 1861.

It was founded by Dr. William Lockhart for the London Missionary Society and was originally named the Peking Hospital, although locally it was known as the Charity Hospital. The London Missionary Society had been founded in England in 1795 by evangelical Anglicans and various non-conformist groups. Congregational missions were established in Oceania and Africa, but there were also Presbyterian missionaries who were particularly active in China.[2]

PUMCH has undergone several name changes over the years. It became known as the Union Medical College Hospital after amalgamation of the Charity Hospital with several smaller clinics and hospitals, and the addition of a new medical school under the direction of the London Missionary Society. The Union Medical College was transformed when the Empress Dowager Cixi helped to finance the rebuilding of the Charity Hospital after its destruction during the Boxer Rebellion in 1901. When the China Medical Board of the Rockefeller Foundation acquired Union Medical College and its hospital in 1915 for US $200,000 its facilities were greatly expanded. The college became known as the Peking Union Medical College, and its affiliated hospital became known as the Peking Union Medical College Hospital.[3]

During the 31-year period between 1910 and 1941 several British qualified pharmacists were recruited to be in charge of both education and practice in the pharmacy department of PUMCH at different times. They included Alfred Skinn, Arthur Britland, Bernard Read, John Cameron, Moody Meng and Arthur Tye. Together with the local pharmacy team these individuals inspired and developed a culture of quality clinical pharmacy practice which has had a long lasting impact.

Moody Meng, who worked at PUMCH for a total of ten years over two periods (between 1916 and 1919 and between 1925 and 1931 respectively) was the first Chinese to become a member of the Pharmaceutical Society of Great Britain in 1924. Meng was a formidable figure in China's pharmacy profession for over half a century, transcending both the Nationalist and Communist governments.

This paper provides an overview of the history of western pharmacy development in PUMCH over the 31-year period between 1910 and 1941, with an emphasis on the roles of British qualified pharmacists who were key players at the leading hospital during the period. It begins however with a brief account of the leading British physicians who pioneered western medicine in China during the nineteenth century.

Dr William Lockhart and the London Missionary Society

Dr William Lockhart (Figure 1) was born in Liverpool in 1811 and received his medical education and training at Meath's Hospital in Dublin and Guy's Hospital in London.[4] He became a member of the Royal College of Surgeons in 1834. He joined the London Missionary Society and worked first at the Canton Ophthalmic Hospital (also known as the Canton Dispensary) in 1839. Over a 20-year period he was instrumental in the opening of four western hospitals, in Chusan (1841), Hong Kong (1842), Shanghai (1844) and Peking (1861).[5]

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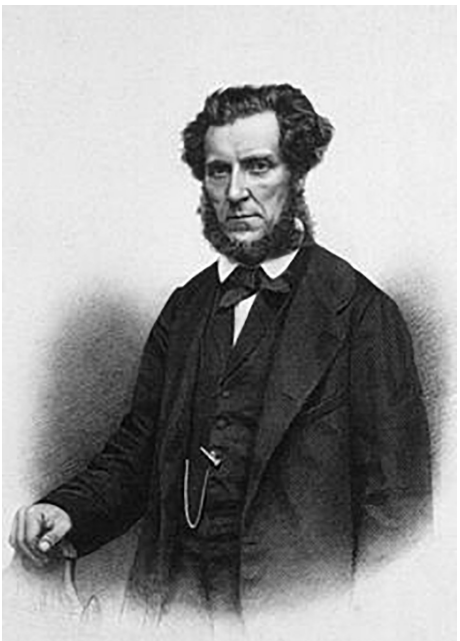

Figure 1: *Dr. William Lockhart, 1811-1896 (Source: Wikipedia)*

In September 1861 Lockhart moved to Peking (called Beijing since 1958 when the new pinyin replaced the previously used Wade-Giles as the official romanization system) and became a senior physician to the British Legation. A month later he helped the London Missionary Society to open the Peking Hospital (the Charity Hospital). In the first year he treated 22,144 patients or more than 60 a day.[6] Lockhart published a book about his 20-years' experience as a missionary doctor in China.[7] Over this period during the late Qing or 'Manchu' Dynasty he made significant contributions to both health services and to the cause of evangelism in China. In 1864 he was succeeded at the Peking Hospital by Dr John Dudgeon.

Dr John Dudgeon and the 'Two Flagstaffs' Hospital

Dr John Dudgeon (Figure 2) was born on 7 April 1837; he received his medical qualification in Edinburgh, and was subsequently awarded an MD and a Master of Surgery from the University of Glasgow in 1862.[8] He joined the Missionary Society in 1863 and arrived in Peking the following year, succeeding Lockhart. Dudgeon was also a physician to the British Legation in Peking from 1864 to 1868. In 1865 he acquired a Buddhist temple with two flagstaffs located at Hatamen Boulevard (now called Chongwenmen Street) and expanded the Charity Hospital at this new venue. During this period the locals commonly referred to the Charity Hospital as 'the Two Flagstaffs Hospital'.

Dudgeon was appointed professor of anatomy and physiology at the Imperial College (Tongwen Guan) of the Qing Government during the 1870s and 1880s. Over a period of ten years he translated both *Gray's Anatomy* and *Holden's Osteology* into an 18-volume Chinese edition that was published in 1884.[9] Dudgeon was a champion of the anti-opium crusade in the 1870s and advocated against the use of morphine as a substitute of opium when the addictive effects of morphine became known to be even worse than opium. After repeated conflicts over the prioritization of evangelical and medical work with the Society Dudgeon resigned in 1884. Thereafter he continued in private practice in Peking until his death in February 1901.

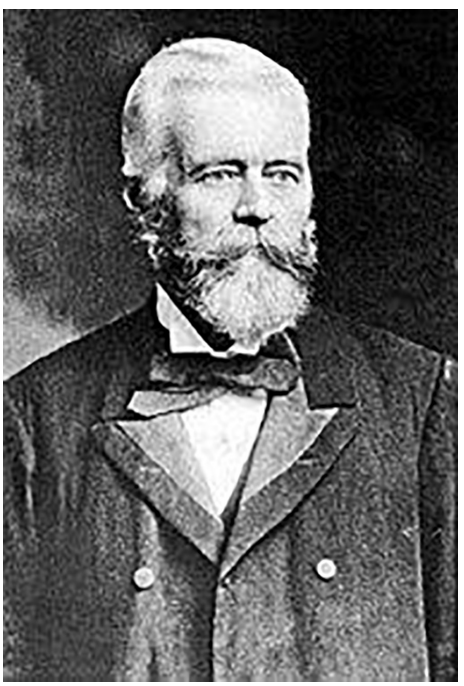

Figure 2: *Dr. John Dudgeon, 1837-1901 (Source: Fudan University)*

Dr Thomas Cochrane and the Endowment of Union Medical College

Dr Thomas Cochrane was a Scotsman who had studied medicine in Glasgow. He served in Chaoyang, Manchuria, from 19 May 1887 to the spring of 1900. The Two Flagstaffs Hospital was burnt down towards the end of the Boxer Rebellion. This was a protest by an anti-Christian and anti-foreign militia band that had been instigated by a group of court officials; it led to a violent uprising in 1899 which was finally crushed by the eight-nation alliance in 1900.[10] A year later Cochrane returned to China, arriving in Peking on 20 November 1901.[11] He had treated many important patients of the Imperial Court including Li Lianying, the

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chief eunuch who was the personal attendant of the Empress Dowager Cixi (Figure 3).

Figure 3: *The Empress Dowager Cixi, 1835-1908 (Source: Hubert Vos)*

The Empress was persuaded by Li at the suggestion of Cochrane to support the building of a new 30-bed hospital and a medical school. She donated 1,400 pounds (equivalent to 10,000 taels of silver) towards the cost. A further 1,600 pounds were contributed by senior officials of the Imperial Court, and there were also donations from the Arthington Trust via the London Missionary Society. The project was completed in 1906 and signaled the rebirth of the institution with a new name, the Union Medical College.[12]

In the same year 40 students were enrolled at the Union Medical College for the study of medicine on a five-year curriculum. Sixteen medical students graduated five years later in April 1911.[13] The Union Medical College was the only missionary medical school recognized by the Board of Education of the Qing Government.[14]

John D. Rockefeller and the China Medical Board

The Rockefeller Foundation (the Foundation) was established in the spring of 1913 by John D. Rockefeller (Figure 4), an American oil king, with the aim of bringing western medicine to developing countries including China.[15] The first China Medical Commission (the Commission) organized by the Foundation arrived in Peking on 18 April 1914. It visited seventeen medical schools that were considered to be representative of the state of medical education in China.[16] The China Medical Board (the CMB) was set up by the Foundation on 30 November 1914 to implement the recommendations of the Commission with the aim of building a strong and influential medical school in China.

Figure 4: *John D. Rockefeller, 1839-1937 (Source: Baike)*

In 1914 a total of 244 mission hospitals and 446 western doctors were known to be serving the 400 million population in China (the population increased by threefold over a period of 100 years to 1.35 billion in 2016). Major disease problems at the time were mainly infectious in nature such as syphilis, hookworm, and tuberculosis.[17] In the same year the Union Medical College had 14 western doctors, 95 medical students studying the five-year curriculum, and 43 students in a preparatory department undertaking a one-year programme. Amongst the sixteen other medical schools reviewed by the Commission at the time the Union Medical College was the one that stood out as the most eligible candidate for investment by the Foundation.

Transfer of Union Medical College to China Medical Board

The logo of CMB is composed of a dragon and a rod that is similar to the Rod of Asclepius (Figure 5). Wallace Buttrick, the first director of the CMB, visited the missionary societies in England in April 1915 during the First World War to enlist their support and to establish the terms for the final purchase of the Union Medical College from the Missionary Society. Cochrane, the founder of the Union Medical College and then medical director of the Missionary Society,

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supported the sale of the assets of the Union Medical College to the CMB. The sale marked a new era for the Union Medical College, which was renamed as the Peking Union Medical College (the College) by the CMB, and its wholly owned hospital was renamed as the Peking Union Medical College Hospital (PUMCH).

Figure 5: *China Medical Board Logo, with Dragon and Rod (Source: PUMCH)*

On 2 June 1915 a memorandum was signed by the CMB with the Missionary Society for the transfer of the properties owned by the latter for the sum of US $200,000. An additional fund of US $1 million for land, buildings and equipment was budgeted by the Foundation in April 1916.[18] The College was officially opened on 11 September 1917 when the first group of eight students enrolled at its pre-medical school. The new hospital, PUMCH, was completed with 250 beds in 1921. A total of US $7.6 million was spent on the project, which was many times over the original budget. This was due to lack of management control, the inadequate construction experience of the CMB, and high shipping costs during the First World War.[19]

Bernard Emms Read and Chinese materia medica

Bernard Emms Read (Figure 6) was born in Brighton, England on 17 May 1887.[20] A devout Christian, Read graduated with a Diploma from the Pharmaceutical Society's School of Pharmacy, in 1908. He passed the major examination and registered as a pharmaceutical chemist with the Pharmaceutical Society of Great Britain (PSGB) in April 1909.[21] He was recruited by Cochrane in 1910. He went to Peking and became a lecturer in chemistry and pharmacy at the then Union Medical College. He was awarded a CMB fellowship in 1916 (during the First World War) and earned an MSc in biochemistry and pharmacology at Yale University in 1918.[22]

Figure 6: *Dr. Bernard Emms Read, 1887-1949 (Source: PUMCH)*

Read returned to the College and became associate professor of physiological chemistry and pursued his research in materia medica. In 1922 he received a second fellowship and returned to Yale. There he completed his PhD within two years, studying the metabolic effects of chaulmoogra oil, the only agent available at the time for the treatment of leprosy. He returned to the College in 1925 to take up the position of chairman and professor of pharmacology. He was an active faculty member and was also a founding member of the Chinese Physiological Society in 1926.

With his extensive knowledge of pharmacognosy Read became a member of the editorial board for the first edition of the *Chinese Pharmacopoeia*, produced under the auspices of the Ministry of Health of the then Nationalist government; the pharmacopoeia was published in May 1930 and distributed in June 1931. In conjunction with several Chinese collaborators he translated volumes 12 to 50 of the *Chinese Materia Medica,* the great herbal compiled by Li Shizhen in the sixteenth century, into English between 1931 and 1941.[23]

Read left the College in 1932 when he felt that the Christian character was being lost in the programmes of the College, as its affiliated PUMCH became a private hospital with only a small section serving the underprivileged.[24] He joined the newly founded Henry Lester Institute for Medical Research (the Henry Lester Institute), a unit of the Lester Chinese Hospital (now called Renji Hospital) in Shanghai, as head of the Division of Physiological Sciences.[25] However, Read retained a relationship with the College and was appointed as a member of its board of directors between 1936 and 1944.

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During the Second World War Read was interned by the Japanese at the Lunghua internment camp in Shanghai. He was interned with another British pharmacist, Donald Mennie, who had been managing director of the pharmacy chain of A.S. Watson of North China, and who was a renowned photographer. Read remained in Shanghai at the end of the war and became the director of the Henry Lester Institute when its then director and his friend, Dr Earle, passed away.

He translated and published a book *Famine Food* (Figure 7) in 1946 detailing the nutritional value of edible plants during famine times in ancient China.[26] Read had been closely associated with the College for 31 years, with 22 years in academia in Peking. Read died in Shanghai on 13 June 1949 after a long illness.

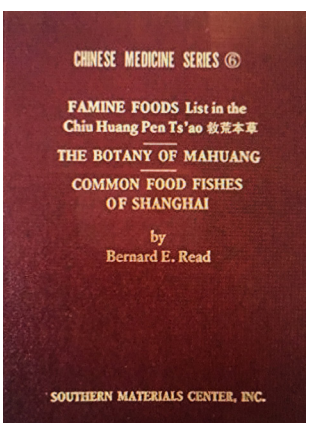

Figure 7: *Front cover of Famine Food, 1946 (Source: PUMCH)*

Alfred John Skinn, pharmacist and physician

Alfred John Skinn was born in 1882 in Bourne, Lincolnshire, England. He qualified as a chemist and druggist in July 1910 and soon afterwards moved to Tientsin (now called Tianjin), a city 66 miles (107 km) from Peking.[27, 28] Prior to joining the College Skinn served as manager of A.S. Watson's Tientsin branch.[29] He served as the hospital pharmacist at the College from 1916 to 1917 when Read was on a scholarship to study for an MS degree in the United States until Britland, his successor, was appointed in 1917.

He then served as the acting treasurer in 1917 until 1919 during the time when George Wilson, the College treasurer, was on leave for war service in Europe. Whilst in Peking he was also a junior warden of the freemasons of the China District of International Chapter of the Grand Lodge of Massachusetts.[30] Skinn returned to Edinburgh, Scotland to study medicine and received his qualification as MB, ChB in July 1925 at the age of 43. He later went to Hong Kong and entered private practice in 1930. Following the end of the Second World War Skinn settled in Queensland, Australia and passed away in 1970 at the age of 88.

Arthur John Britland, a missionary chemist and druggist

Arthur John Daniel Britland was born on 13 August 1878.[31] He passed the minor examination of the Pharmaceutical Society of Great Britain and registered as a chemist and druggist on 9 January 1902.[32] At the age of 38 he joined the Anglican Mission to work in Peking as a hospital pharmacist. He worked at the College between 1917 and 1919. He had an assistant pharmacist, Yin-Dah Hsu, who was one of the two graduates at the Yale College in China in 1916. Hsu had received a CMB scholarship with two others, and graduated as a pharmaceutical chemist at the University of Maryland in 1918.

Britland was succeeded by John Cameron, who became the supervisor of pharmacy at PUMCH in 1920. After leaving PUMCH Britland continued to live in Peking and worked for the Church of England Peking Mission. Britland interviewed Moody Meng in mid-1924 for a position as assistant pharmacist on behalf of PUMCH. [33]

He was interned during the Japanese occupation in Weihsien (now called Weixian) in Shandong Province from 1943 until 1945. Britland returned to the United Kingdom after World War Two and passed away on 21 November 1966.[34]

John Cameron, an architect of modern hospital pharmacy in China

John Cameron was born in Scotland in 1891.[35] He received his MPS (member of the Pharmaceutical Society of Great Britain) qualification in 1920 and moved to Peking soon afterwards. He witnessed the opening of the enlarged College with funding from the Foundation upon its completion in 1921 (Figure 8).

Figure 8: *Entrance to PUMCH with the two flag staffs, 1920s (Source: PUMCH)*

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Table 1: *Select List of Publications by John Cameron, 1924-27*

Date	Article	Publication
August 1924	The chemical purity of carbon tetrachloride	China Medical Journal
April 1925	Observations of hydrogen peroxide	China Medical Journal
May 1925	Eradication of the cockroach	China Medical Journal
6 June 1925	The old and the new in pharmacy in China (with K.K. Chen)	Pharmaceutical Journal, London
11 August 1926	Some observations on pharmacy in Great Britain	Pharmaceutical Journal, London
December 1926	The danger of purchasing anywhere	China Medical Journal
March 1927	Pharmacy in China 1927	American Druggist
March 1927	A pharmaceutical aspect of China in 1927	American Journal of Pharmacy
April 1927	Adulterations	China Medical Journal
April 1927	Pharmaceutical Sterilization	China Medical Journal
May, June and July 1927	A few practical suggestions for hospital pharmacists in China	China Medical Journal

Cameron served PUMCH between 1920 and 1940 as supervisor of pharmacy, and developed the first hospital formulary in China in the early 1920s. At PUMCH he supervised Moody Meng who later became the chief pharmacist at the National Health Administration (previously called the Ministry of Health in 1929 when first founded by the Nationalist government in Nanking) in 1932. Cameron was a prolific writer and published many papers in both American and British pharmaceutical journals (Table 1).[36]

Cameron opened a new evening pharmacy school in May 1929 under the auspices of the North China Pharmaceutical Society to train pharmacy dispensers. In its first year 54 students attended the course (See Annual Report of 20 June 1929 below).[37]

Whilst still being employed by PUMCH in 1939 he was seconded to work at the War Service back in Britain. He resigned from PUMCH the following year to take up a full-time position as Director, Medical Supplies, Middle East Section at the War Service when he was with the Scottish Department of Health.

Cameron was an honorary fellow of the American Pharmaceutical Association, as well as being a fellow of the Pharmaceutical Society of Great Britain, the Chemical Society, the Royal Geological Society, and the Royal Society of Edinburgh. He passed away in Vancouver, Canada in 1964 at the age of 73.[38]

Moody Meng, the first Chinese member of the Pharmaceutical Society of Great Britain

Moody Meng (Figure 9) was born in October 1897 to a Protestant family in Baoding County, Hebei Province, about 93 miles (150 km) southwest of Peking. His father was a pastor of an independent church.[39]

In 1916 after attending high school Meng was recommended by his cousin to work at the pharmacy of PUMCH as a pharmacy assistant while attending courses there.[40] His cousin was Major K.J. Meng, a Republican army surgeon practising at the 3rd Regiment Hospital at the Western Tombs, near Kaopeidian on the outskirt of Peking. With financial help reportedly from Britland for the passage to London, England in 1919 Meng went to work at Allen and Hanbury in 1920 to save up the tuition fees needed to attend the Diploma Course at the School of Pharmacy, University of London in 1922.

Figure 9: *Moody Meng, 1897-1983 (Source: Chinese Pharmaceutical University)*

Meng graduated in 1924 and qualified as a pharmaceutical chemist with the Pharmaceutical Society of Great Britain. He was offered a position as assistant pharmacist at PUMCH in January 1925, succeeding Yin-Dah Hsu who resigned in December 1924.[41] Then

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in 1929 Meng was recruited by Dr J. Heng Liu, the then Vice Minister at the Ministry of Health of the Republican government, to work full-time on the first edition of the *Chinese Pharmacopoeia* in Nanking (now called Nanjing), the capital of the Republican government. This was initially for six months But was subsequently extended to over a year; Meng took leave from PUMCH to undertake the work (Figure 10).

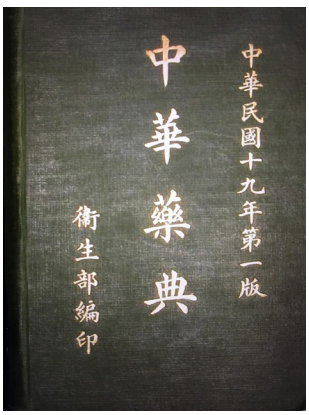

Figure 10: *First Edition of the Chinese Pharmacopoeia, 1931*
(Source: Private Collection)

He returned to PUMCH in May 1930 to be the acting supervisor of the pharmacy department when Cameron was on a year-long leave between 1 July 1930 and 31 July 1931. Whilst there Meng edited two publications: the *Pharmaceutical Journal of the North China Pharmaceutical Society* in 1930, and a booklet entitled *Posology-Percentage-Poisons* published in 1931.

Upon Cameron's return to work in August 1931 Meng's relationship with Cameron deteriorated, purportedly due to Meng not having obtained the prior approval of PUMCH for the two publications. He was again assigned to work with Dr J. Heng in the National Flood Relief Project at the National Health Administration (NHA) on 1 September 1931. Whilst on assignment at the NHA Meng was offered a full-time position by Dr Liu to head the Central Field Station of the NHA to control the supply of drugs and oversee the practice of pharmacists. Meng resigned from PUMCH in January 1932 to take up the new position.[42]

Meng subsequently founded the National School of Pharmacy in Nanking in 1936 with funding from the Ministry of Education. He started a generic drug factory in Hong Kong in 1940 for the Nationalist army when the government retreated from the capital Nanking to Chungking (now called Chongqing) in 1940 at the start of the Sino-Japanese War of 1937-1945. The factory was relocated to Chungking immediately before the take-over of Hong Kong by the Japanese army on 25 December 1941.

Meng became disillusioned with the policies of the Nationalist government after the Second World War, and under his fourth brother's influence he joined the Communist movement secretly in 1947 in Northern China. He became a key decision maker in the formulation of national pharmaceutical strategy when the People's Republic was founded in 1949.

Meng served as the Director General of the China National Institute of Pharmaceutical and Biological Products, and as the Deputy Head of the Chinese Pharmacopoeia Commission from 1962 until 1980 at the age of 83. He passed away in Beijing three years later in 1983 at the age of 86.

The 1929 Annual PUMCH Report on Pharmacy

In the twenty-first annual report of PUMCH published on 30 June 1929, the section compiled by Cameron on the pharmacy department clearly indicated the scale of pharmacy operations and the role of the department in pharmacy education. It read:

The work of the pharmacy continues to increase. This year 7,736 more prescriptions were dispensed than during the previous year. The total number of preparations supplied was over one hundred thousand for the entire year (Table 2). Staff prescriptions have heretofore been considered with the inpatients but this year are included under the outpatient prescriptions.

The report also highlighted the roles and activities of staff and drew attention to the training provided by the hospital. It continued:

Mr Moody Meng, the assistant pharmacist, was granted leave of absence of six months in order to prepare a new Chinese pharmacopoeia for the Ministry of Health in Nanking. Mr W.H. Tu, has been responsible for the prescription department of the Pharmacy dur-

Table 2: *Number of Prescriptions Dispensed at PUMCH, 1926-1930*

For Year Ending June 30	1926-27	1927-28	1929-30
Outpatient prescriptions	36,250	41,200	48,936
In-patient prescriptions	10,200	11,100	5,200
Total	47,450	52,300	54,136
Year-on-Year Variance	NIL	5,850 or +12.6%	1,836 or +3.5%

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ing Meng's absence. Six students from other hospitals have been given special training in pharmacy during the year. The senior members of the pharmacy staff have all been appointed lecturers in the new Pharmacy evening school which opened in May 1929, under the auspices of the North China Pharmaceutical Society. This school has had 54 students in attendance.[43]

Arthur Tye, academic and hospital pharmacist

Arthur Tye (Chinese name was Yeh Ching-Tung) was of Chinese descent and was born as a British subject in Rutherglen, Victoria, Australia in 1909. He received his pharmaceutical chemist qualification at Melbourne College of Pharmacy in 1930.[44]

Tye joined the staff as assistant pharmacist at PUMCH on 1 April 1932 succeeding Moody Meng, and he also served as a lecturer in pharmacology at the College. When John Cameron returned to the United Kingdom and joined the War Service in 1939, Tye became the acting supervisor of the pharmacy department until December 1941 when the United States declared war on Japan, which had already occupied Peiping (now called Beijing) since 1937.

Tye emigrated to the United States in 1947, entered the Ohio State University College of Pharmacy and completed a PhD degree on the quantitation of analgesic actions of opiates in 1950. He was appointed to the faculty as assistant professor in 1950 until his retirement as assistant dean and professor of pharmacy in 1970.[45]

Tye passed away in Santa Rosa, Sonoma County, California in 1987 at the age of 78.[46]

Thirty-one years of British pharmacy at PUMCH

This paper has shown that four of the six British qualified pharmacists employed at PUMCH between 1910 and 1941 (Bernard Read, John Cameron, Moody Meng and Arthur Tye) had long lasting associations with this institution. They were all instrumental in setting the standards for the pharmacy department at PUMCH during this period. Indeed their rigorous application of the highest standards in pharmacy education and practice also demonstrated their firm commitment to the introduction of western pharmacy into China.

The research work conducted by Bernard Emms Read, a renowned pharmacologist of his time, and his contributions to the compilation of the first edition of the *Chinese Pharmacopoeia*, aptly demonstrated his dedication and perseverance in the field of academic pharmacy. The development of local talents and the training of pharmacy technicians and dispensers initiated by Read and subsequently followed through by his successors at PUMCH laid a strong foundation for western pharmacy to take root in China. Both the *British Pharmacopoei*a and *The Extra Pharmacopoeia* have continued to serve as important guides to PUMCH's pharmacists in their daily practice.

Although Arthur Britland did not stay long at PUMCH, his selection of Moody Meng to succeed Ying-Dah Hsu as the assistant pharmacist at PUMCH in 1925 was crucial to Meng's career, and consequently his contributions to pharmacy during both the Republican and Communist times. The first known hospital formulary (and its subsequent editions) in China were developed by John Cameron in the period 1920-1940, which has set the standard for all other Chinese hospitals since.

Meng spent a total of ten years working full-time at PUMCH; 1916-1919 as a pharmacy assistant, 1925-1929 as an assistant pharmacist, and 1930-1931 as the acting supervisor of pharmacy department. His time with Allen and Hanbury in Britain and his studies at the School of Pharmacy, University of London between 1922 and 1924 had inspired Meng to develop national strategies in generic drug production and pharmacy education to serve the vast population of China. Meng had truly left a footprint in the history of pharmacy education in modern China.

Conclusion

In conclusion it can be said that Read, Cameron, Meng, Tye and others greatly contributed to the rapid development of the leading Chinese hospital, PUMCH, within the thirty-one year period between 1910 and 1941 under the direction of the China Medical Board, assisted by the financial support provided by the Rockefeller Foundation. Together they left a legacy that truly deserves recognition in the history of pharmacy at PUMCH.

The pursuit of excellence in academic research and clinical pharmacy practice has become the hallmark of PUMCH's pharmacy department. This culture has remained unmoved despite the many political changes that occurred during its history. It has continued to be a pioneer in best clinical pharmacy practice in the 68 years since the establishment of the People's Republic of China in 1949.

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Frontline Pharmacy: Letters from the First World War 1914-1918

Norma Cox

Abstract

During the First World War the two British pharmacy journals, the *Chemist & Druggist* and the *Pharmaceutical Journal,* continued to be published on a weekly basis. They acted as an important forum for the sharing of news and important information, for recording the movements of pharmacy individuals, and reporting those killed, injured or captured. Pharmacists on active service, in training, or serving the community at home, as well as other groups working alongside them, wrote letters describing their thoughts and experiences. This short communication describes four of the letters that were published during the course of the war.

Introduction

While I was researching the First World War for a BSHP poster in 2014, I came upon letters that were about pharmacists and pharmacy assistants, they were written during the First World War. These letters were printed in the *Chemist & Druggist* and the *Pharmaceutical Journal* during the years 1914-1918. The letters told of their experiences and contained a lot of information on Pharmacy and its application during those times. They described details of the local environment, but classified locations were erased by the censor. The letters were anonymous, so the fate of the writers would not be known. In this short communication I describe four of these letters in order to inform people of their existence and to share the knowledge that they hold.

The apprentice's letter, September 1914

The first letter was sent to a London pharmacist from his former apprentice and was printed in the *Pharmaceutical Journal*.[1] The apprentice was training at Aldershot and pointed out to the pharmacist, rather teasingly, that he had not done any dispensing yet. He was with 48 other dispensers. His rank was a private and the training that he received was the same as any ordinary recruit of the Royal Army Medical Corps (RAMC). He believed that he would become a sergeant when he joined a unit.

All of the recruits arose at 5am with reveille, they washed and shaved, they cleaned the tent, and if the weather was good they played football for half an hour before the first parade at 6.20am, which lasted an hour. Breakfast was of bread and butter, bully beef or cheese and tea. They paraded again at 8am, after which they exercised in a route march of 15 miles in the countryside around Aldershot, through Farnborough, Oak Vale and Fleet (the writer had incorrectly named Ash Vale as Oak Vale). The midday meal, the dinner, was from 12.30pm to 1.30pm, followed by a parade at 1.30pm.

Figure 1: *Recruitment poster for RAMC (Source: Imperial War Museum London Photographic Archive)*

This was followed by drill in the parade square for two and a half hours. Their day's work ended after drill, unless they went on fatigue work. Tea was the last meal of the day, and was like breakfast.

The letter writer had been on guard duty three times that week and commented that the dispensers seemed to be chosen for all the fatigue work. The recruits were not allowed to leave camp until 6pm. Then they all went to Aldershot, but they were not allowed to leave the town. They had to be back in camp by 9pm where another roll call was made. The pharmacy apprentice had taken several books with him to study and to help him save money for college expenses, if he was not playing football. He initially slept in a tent with 11 others, but six more recruits were squeezed into the tent. With 'one blanket apiece and eight waterproof sheets to cover the tent ground' tent life became very uncomfortable. Camp life was rough but team spirit and camara-

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derie gave much pleasure. All of the recruits longed to be off to war, despite the news that some of their comrades had fared very badly.

The front line pharmacist's letter, January 1917

The second letter was from a 'pharmacist at the front' who had written to the editor of the *Chemist & Druggist*.[2] The letter described the journey of the pharmacist, who was part of a group of 40 who had responded to the call for reinforcements. They travelled by lifeboat out to a steamer in the bay. Other groups joined. It was a windy evening as they headed for the Peninsula. They arrived in darkness as 'a great searchlight swept before them'. Gunfire could be heard and 'star-shells soared above the trenches and sudden flashes showed where shrapnel poured leaden rain from the sky'.

The ship dropped anchor there, until a sudden order hurried them off the ship on to a petrol-driven lighter, waiting alongside. They landed at dawn onto a cramped beach, and were then lead by their officer, as they sought out their head-quarters. After an hour or two the men breakfasted on their 'iron rations' of biscuit and bully beef, until an officer informed them that the beach was to be shelled. They were ordered to take cover but the men carried on with their meal despite the shelling.

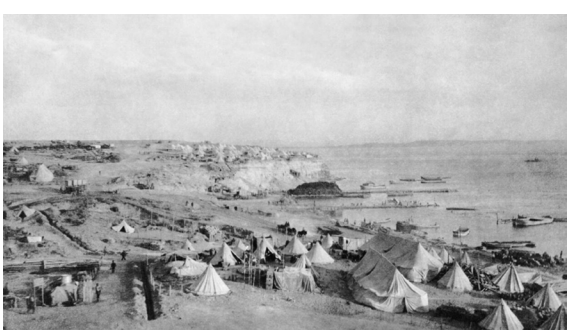

Figure 2: *Under canvas on Gallipoli beach, Turkey (Source: Imperial War Museum London Photographic Archive)*

The letter-writer remarked that the men were 'typical British Tommies', for although this was their baptism of fire, they would not let 'a mere bombardment interfere with their breakfast'. In the afternoon they reached the field-ambulance where the pharmacist was received into the unit, he felt that at last he belonged somewhere, he was no longer a 'detail'. The pharmacist wrote that he had a pleasant time in this Eastern or Oriental situation, for the battle had settled into trench warfare.

His hours off duty were spent looking for botanic plants in the sand-hills, on the neighbouring plain, or exploring the stony wilderness. He was not familiar with the plants and 'longed for his friends *Bentham and Hooker* in their weather-beaten blue-cloth boards.' This was a book about British Flora.[3] He identified a dwarf scrub-oak by its acorns, juniper with its red berries, sea-holly, succory, various sedges and grasses. He found a few daisies and wistfully sighed for an English meadow.

He developed his skills as a cook with the limited materials at his disposal. He experimented using his culinary art in the dispensary. One day the Commanding Officer arrived and announced that the dispensary smelt like a 'damned Lockhart' (an American restaurant chain). He produced a chewy candy, with chewing-gum properties, made from golden syrup. At the end of his letter he mentioned a November blizzard and a shelling attack by the enemy. Unscathed, he collected up leaden mementoes and kept them among the panniers. The letter finished as his unit was ordered to evacuate.

The chief dispenser's letter, January 1917

The third letter was from a chief dispenser in a military hospital, who wrote to the *Chemist & Druggist* to renew his subscription.[4] He commented on how interesting and useful the *Chemist & Druggist* was, especially in the last year, where there had been rapid and frequent prices rises. He used the trade reports of the *Chemist & Druggist* to determine if price increases were fair and reasonable. The hospital where he was stationed had previously been an 'institution',[5] and its transition into a military hospital for sick and wounded soldiers had introduced great changes into the 'local pharmacopoeia'. Formulae for medicines used in France and elsewhere, such as Eusol, Dakin's Solution, Bismuth and Iodide paste, had appeared in the *Chemist & Druggist* and were very useful in his work. Abstracts from medical papers concerning new treatments were invaluable in keeping his knowledge up to date. He occasionally received details of friends via the *Chemist & Druggist* personal column.

Figure 3: *Dispensing staff outside medical store (Source: Wellcome Images, Royal Army Medical Corps Muniment Collection)*

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He wrote that the institution was an ideal place for the reception of sick and wounded soldiers, who arrived in convoys from the front every week. There were over 30 large bright wards, and from their windows views over the wooded countryside could be seen. The grounds were laid out and during the summer months, cricket, tennis, croquet, and bowls were played. Those who were unable to take part had their beds moved outside under the trees, to enjoy the surroundings. This peaceful setting, together with the uniforms of the convalescent, the sisters and the nurses, made for a 'picturesque scene'.

In the winter the soldiers were entertained by concerts in the big hall, and those who could not leave their beds were entertained in their wards. The hospital had capacity for 1,500 wounded soldiers; there were three operating theatres, two x-ray departments, two massage rooms as well as the other departments of a large well-equipped hospital. The dispenser explained that after the War Office took over the place, the duties of the dispenser were to arrange, indent for, receive and unpack the whole of the instruments, appliances, and all other supplies of a medical and surgical nature for all the departments as well as the dispensary needs.

The maintaining of stock levels and all the correspondence involved was a large task for the dispensary. The chief dispenser wrote that they used vast quantities of tinct. iodi. mit. BP (tincture of iodine), hydrogen peroxide, acetosalicylic acid, gauze, and absorbent wool. The staff included three lady dispensers and two orderlies, and they were all kept busy. In addition there were prescriptions from the 20 medical officers, and they also had to make and fit splints. At times duties were arduous. The rank of this chief dispenser was quartermaster-sergeant, which, next to regimental sergeant major, was the highest that could be given to a non-combatant in the RAMC.

The captain's letter, August 1917

The fourth letter was from a captain in the RAMC who had written to the editor of the *Chemist & Druggist*.[6] The letter was entitled 'the army dispenser' and it was unusual, firstly from its tone, and secondly from the fact that the author, a captain, was not himself a pharmacist. He began by expressing his anxiety at not being able to find a good cook at the hospital. He informed the reader that in the army a good cook was more difficult to find than a good pharmacist, as cooks were few and dispensers were plenty. The best cook he knew in the army was not a pharmacist.

There followed a story about this cook, a fine soldier, a respected disciplinarian of 12 years service, holding the rank of acting staff-sergeant. His ambition was to be a sergeant-major or a pensionable staff-sergeant, but he could not because he did not have the dispenser's certificate. The aim of the story was to highlight the value of having a dispenser's certificate. He wrote that many certificates were accepted for the post of army dispenser; these included the major and minor qualifications awarded by the Pharmaceutical Society of Great Britain, and the licences and certificates awarded by the Apothecaries Halls. The ordinary pharmacist may regard his qualification with contempt, but it was very necessary in the RAMC. He observed that he had seen very few chemists in those ranks during the last couple of years. He told of another man, a non-commissioned officer (NCO) who 'although not so good a man' was a sergeant-major, and in peace-time he had to be transferred 2,000 miles to a hospital (which was permitted to give certificates for dispensing) before he got it.

Figure 4: *Hospital ward in country house (Source: Imperial War Museum London Photographic Archive)*

The writer then commented on the discussions in the *Chemist & Druggist* on the propriety of giving commissions to pharmacists. He suggested that a commission was within reach of a sergeant of the RAMC if he became a quartermaster, but without the dispensing certificate he would not reach quartermaster. He explained that in peacetime, the certificate was part of the ordinary training, but now there was no time to train men for dispensing. In addition commissions may not be of benefit to married men, for there was not an allowance for a wife and children. On the other hand, a sergeant-major, with a wife and family, had pay and benefits. The letter then discussed the role of a private in the RAMC which could be menial with scrubbing floors, but that the role of the dispenser even if only a corporal, had a position of authority which was respected. This was because he controlled the drugs, the surgical instruments and appliances.

The writer then suggested that all supplies had to go through the dispenser and if you wanted an appli-

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ance or instrument, you must get it from the dispenser on loan. If however the dispenser was inclined to be unpleasant, he could disinter Army Orders, which forbade anyone from ordering anything but a purgative pill or any instrument except their own. The writer commented that the dispenser probably spent more of his time with the commanding officer, than anyone else did in the place. Also, that the commanding officer was held financially responsible for drugs or instruments which were not accounted for. The dispenser therefore had many opportunities to lodge complaints against the prescribers.

He wrote very sarcastically that the 'accuracy of checking and the supply of drugs and instruments was a marvel'. That it 'would pay no retail pharmacist, for it takes two or three army men to do as much work as one civil dispenser, but then they do it rather well'. The army dispenser would 'not think of dusting the bottles, cleaning up or spade-work', for he had two or three orderlies to do the work, not to mention one or two assistant dispensers. The dispenser needed to be familiar with the procedures of indenting for all surgical instruments and know the intricacies of every army form. Finally, he described a typical working day; it was busy in the morning, and evenings were generally quiet. The army dispenser was 'fairly free of his own domain'. There was the occasional parade, or kit inspection. Everybody – the medical officers, the matron, the sister and the nurses – were on friendly terms with the dispenser as 'he could always do any of them a service'.

Conclusion

The letters published in the *Chemist & Druggist* and the *Pharmaceutical Journal* give us an insight into the lives of pharmacists and pharmacy assistants serving in the RAMC during the First World War. They provide a window into the diversity of people, roles and experience that constituted the pharmacy contribution to the First World War effort. They also offer an insight to some of the issues facing pharmacists during the war, and attitudes to them. One of the letters – that entitled 'the army dispenser' – was written by a captain in the RAMC, who would most likely have been a surgeon.[7] This letter was scathing and resentful towards the army dispenser.

In 2014 the United Kingdom commemorated the centenary of the outbreak of the First World War. To date there has been little published about the life and work of pharmacists during the war.[8] The recording and interpretation of these letters is an important aspect of the history of pharmacy. For the pharmacists themselves 'there can be no greater memorial than from the words of those who were there'.[9]

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Endnotes and References

1. Letters. *Pharmaceutical Journal and Pharmacist.* 1914; 85: 431.
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3. The Bentham and Hooker system was a taxonomic system for seed plants. It was first published in the book *Genera plantarum ad exemplaria imprimis in herbariis kewensibus servata definita* written by George Bentham and Sir Joseph Dalton Hooker. It was published in three volumes between 1862-1883 by Lovell Reeve & Co. Ltd of London. A large number of editions appeared during the early decades of the twentieth century, under the title *Handbook of the British Flora: A Description of the Flowering Plants and Ferns Indigenous to, or Naturalised in The British Isles.*
4. Letters. *Chemist & Druggist.* 1917; 89: 51.
5. From the description given it would seem that this particular 'institution' was one of the privately owned grand halls and country houses that were requisitioned by the government for use as barracks, training centres or hospitals.
6. Letters. *Chemist & Druggist.* 1917; 89: 34.
7. For an account of the role of the RAMC during the First World War see http://www.1914-1918.net/ramc.htm. Accessed 27 May 2017.
8. For example, see Anderson, SC. Serving on the Front Line and Back at Home: Pharmacy and the Great War. *The Pharmaceutical Journal.* 2014; 293: 110-113.
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An approach to Leslie G. Matthews (1897-1997): an overseas visitor to his London home

Christiane Staiger and Peter G. Homan

Abstract

Leslie G. Matthews (1897 to 1997) has been described as the doyen of British pharmacy history during the twentieth century. His many interests and activities included convivial interactions with colleagues from around the world. He received many visitors and was generous with both his time and expertise. This short communication reports the discovery of a hand-written note from Matthews found at the Kremers Reference Files in Madison, Wisconsin. It gives detailed instructions to an American visitor about how to find his home in London. It reveals much about Matthews' attention to detail and about the welcome he provided for visitors from abroad.

Zusammenfassung

Leslie G. Matthews (1897 bis 1997) gilt als der Nestor der britischen Pharmaziegeschichte des 20. Jahrhunderts. Neben seinen vielfältigen Interessen und Tätigkeiten pflegte er auch gute Kontakte zu Kollegen auf der ganzen Welt. Zahlreichen Besuchern stand er stets mit einem offenen Ohr und gutem Rat zur Seite. Diese Kurzmitteilung berichtet über den Fund einer kleinen handschriftlichen Skizze in den Kremers Reference Files in Madison, Wisconsin. Matthews zeichnete für einen Besucher aus den USA detailliert den Weg zu seiner Wohnung in London. Die Skizze ist ein Beleg für seine Gastfreundschaft, denn sie zeigt, welche Sorgfalt er walten ließ, damit sein Besucher den Weg nicht verfehlte.

Introduction

One of the most prominent personalities in British history of pharmacy was Leslie Gerald Matthews. He was born on 30 November 1897 in Tharston, Norfolk, England, where he had quite a difficult early life.[1] During the First World War he served as a stretcher-bearer, earned a medal for bravery under fire and was severely wounded. He entered pharmacy and had a distinguished career with Burroughs Wellcome.[2] In 1945 he was called to the Bar of the Middle Temple, qualifying as a barrister.[3] His outstanding work for the history of pharmacy is well documented through several books, including the internationally highly recognised *History of Pharmacy in Britain,*[4] and some 200 papers. He died, aged 99, on 24 February 1997.[5 6]

Ann Hutton described Matthews in his obituary as 'extremely generous to others. […] A difficult request for information or advice would produce an invitation to meet. And he would contribute from his vast knowledge and experience'.[5]

It is therefore no surprise that he also invited people into his private home, which was located at Pump Court, at the very heart of the Temple area of London. The University of Wisconsin in Madison, School of Pharmacy, holds a small piece of paper in the collection of the Kremers Reference Files (KRF) that proves his efforts to facilitate guests' orientation.

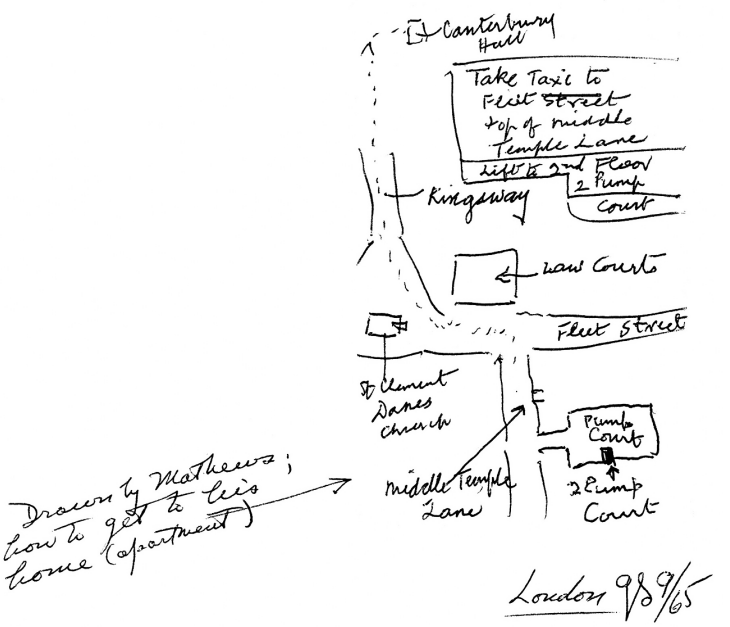

Figure 1: *Sketch drawn by Leslie Matthews (source: Kremers Reference Files)*

An American visitor

For a guest from the USA, Matthews drew a sketch to visualize the way to his home[7] (Figure 1). On the right, he instructed 'Take Taxi to Fleet Street, top of Middle Temple Lane', and then take 'Lift to 2nd Floor 2 Pump Court'. Further, he highlighted several streets and buildings as points of orientation. These were Canterbury Hall, Kingsway, Law Courts, Fleet Street,

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St Clement Danes Church, Middle Temple Lane, Pump Court, and he marked in particular the destination: '2 Pump Court'.
The sketch is dated 'London [9th?] 9/65'. In a different hand-writing there was added on the left: 'Drawn by Mathews [!]; how to get to his home (apartment)'.

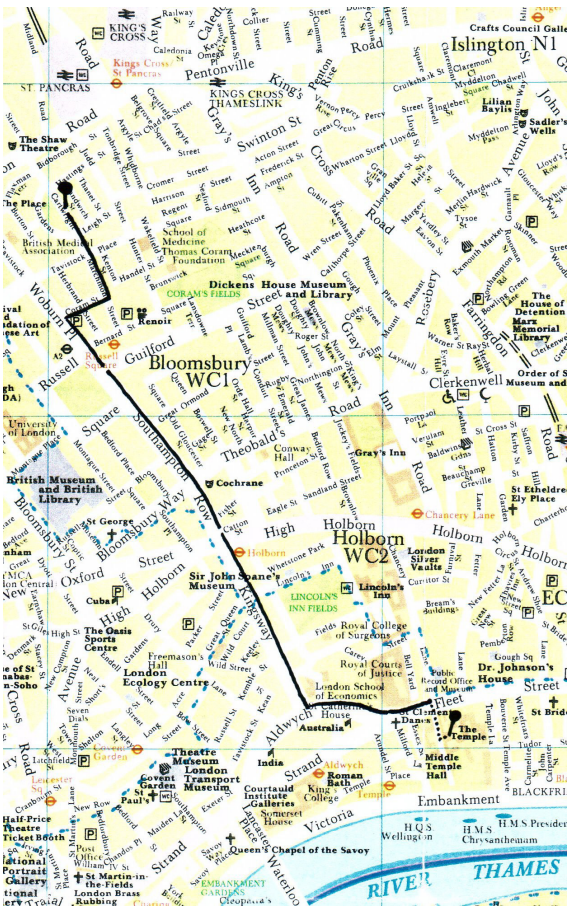

Figure 2: *The way Matthews described on the London map of 1995 (source: authors)*

In the map of London we have highlighted the full way (Figure 2). The car distance from Canterbury Hall to the corner Fleet Street/Middle Temple Lane is approximately 1.6 miles (2.5 km) and the walking distance from there to 2 Pump Court (Figure 3) is about 400 ft (120 m).

Matthew's life

Matthews did not move many times. He qualified as a Chemist and Druggist on 8 July 1920 and as a Pharmaceutical Chemist on 14 April 1921, and the register of the Royal Pharmaceutical Society of Great Britain shows that he stayed in Tasburgh, Norwich, until 1934. From 1934 to 1939 his Pharmaceutical Society registered address was Burroughs Wellcome, Ltd, Snow Hill

Figure 3: *2/3 Pump Court, London today (source: authors, June 2017)*

London. Between 1939 and 1953 he was living at 16 Vivian Way, London N2. From 1953 until his death in 1997 he became a Temple resident and lived at the above-mentioned address, 2 Pump Court, Temple, London EC4Y 7AH.[8]
Matthews was married to Elspeth Mary Matthews, who died in 1990.[9] In 1992, on the occasion of its 25th anniversary, the British Society for the History of Pharmacy (BSHP) endowed a medal for distinction in the history of British pharmacy. It was named in Matthew's honour and he, himself was the first recipient.[10]

Matthew's bookplate

A very well designed bookplate shows some of his particular personal interests.[11] (Figure 4).

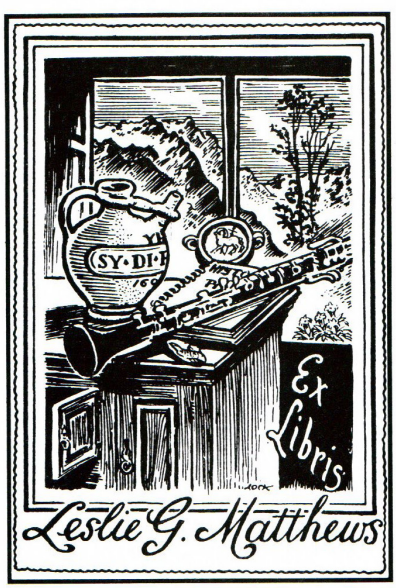

Figure 4: *Bookplate of Leslie G. Matthews (source: Pharmaceutical Historian. 1998; 28: 13)*

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We do not claim to have identified and interpreted all the symbols, but it is well documented that he played the oboe. We see the object in front of the oboe as an oyster, as Matthews also has been described as a 'Cordon Bleu cook'[5] and as 'a connoisseur of good food and wine'.[10]

Further objects on the table of the Exlibris are the seal of the Middle Temple (Paschal lamb), and a manuscript with the first letters of "History of Pharmacy" on the title page. The ceramic refers to his excellent expertise in delftware drug jars, which he named also as a "hobby" in a questionnaire of the American Institute of the History of Pharmacy (AIHP).[9] An open door in the left corner of the Exlibris seems to point to a very open minded and welcoming character.

Conclusion

Leslie Matthews (1897 to 1997) has been described as 'excellent company having a fine sense of humour and a fund of interesting experiences'[10]. His many interests and activities depicted in his bookplate included convivial interactions with colleagues from around the world. He invited many visitors and was generous with both his time and expertise. The hand-written note from Matthews found at the Kremers Reference Files in Madison, Wisconsin reveals much about his attention to detail and his character. The sketch gives thorough instructions about how to find his apartment in London to make sure the visitor does not miss the way – and has an easy approach.

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2. Anonymous. Onward from Galen. A current causerie. *Chemist & Druggist.* 1954; 162: 622.

3. Anonymous. Obituaries. Leslie Matthews. *Pharmaceutical Journal.* 1997; 258: 300. The Bar is the specialist profession of barristers, who have been providing expert legal advice and using advocacy skills to represent clients in court since the 13th century. The Middle Temple is one of four Inns of Court. See Website of the Honourable Society of the Middle Temple http://www.middletemple.org.uk. Accessed 26 April 2017.

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7. A2 Mathews [!], Leslie. Kremers Reference Files.

8. Royal Pharmaceutical Society of Great Britain. *Register of Pharmaceutical Chemists*.

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10. Jackson, W.A. and Matthews, L.G. The Leslie Matthews Medal. *Pharmaceutical Historian.* 1992; 22: 1-2. Subsequent recipients of the Leslie Matthews Medal have been: 1992: Leslie G. Matthews MM, FRPharmS, FRSM, FSA, Barrister; 1995: Dr Juanita A.G. Burnby BPharm, PhD, FRPharmS, FSA; 1996: Dr Melvin P. Earles BPharm, MSc, PhD, FRPharmS; 1998: William A. Jackson BSc (Pharm), MSc, FRPharmS; 2010: Ainley Wade, FRPharmS; 2011: Dr Stuart C. Anderson, FRPharmS, PhD; 2011: Dr Peter M Worling, FRPharmS, PhD; 2015: Peter Homan FRPharmS; 2015: Dr John K. Crellin, BPharm, MSc, PhD, LRCP, MRCS; 2017: Prof. Terry Turner OBE, MPharm, FRPharmS.

11. *Pharmaceutical Historian.* 1998; 28: 13. Also Anonymous. Onward from Galen: A current causerie. *Chemist & Druggist.* 1954; 162: 622.

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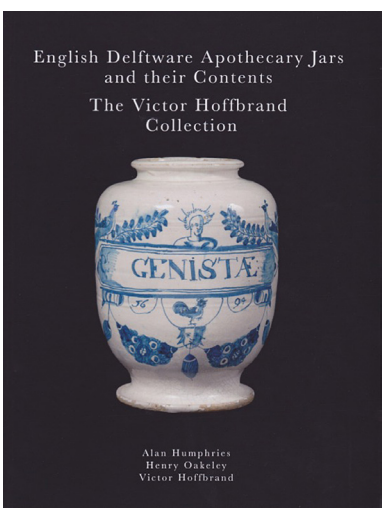
BOOK REVIEW

English Delftware Apothecary Jars and their Contents. The Victor Hoffbrand Collection

By Alan Humphries, Henry Oakeley and Victor Hoffbrand

Leeds and London: Oakeley Books, privately printed by the authors, 2017. Pp. 250. Hardback, price £20.00 plus p&p. ISBN 978-0-9521461-3-1. Softback, price £12.00 plus p&p. ISBN 978-0-9521461-4-8.



Reviewed by Briony Hudson

If you were putting together your dream team of authors for a book about English delftware apothecary jars you might hope for the owner of the collection under review, an expert on the jars themselves and an expert on the medicinal substances stored in the jars. This new publication on the Victor Hoffbrand Collection at the Royal College of Physicians (RCP) in London has achieved that dream, with supremely knowledgeable authors writing on an outstanding collection. At 206 objects it is the second largest collection of English delftware apothecary jars in the world, after the Wilkinson Collection at the Thackray Medical Museum in Leeds.

Alan Humphries, as Librarian at the Thackray Museum, is custodian of the Wilkinson Collection. Since he began cataloguing that collection in 1996 he has built up a vast knowledge of English delftware apothecary jars, and his attention to detail in observing the variations in design and style of lettering are second to none. The introduction to the bibliography for the jars' contents by Dr Henry Oakeley, Garden Fellow at the RCP, exposes the level of referencing and cross-referencing that he has undertaken for the section on the substances that the jars were made to hold. Professor Victor Hoffbrand began amassing the collection in 1976 and has carried out research into their potential apothecary commissioners. The book therefore draws on enormous reservoirs of knowledge and experience.

To say that it is comprehensive would be an understatement: the level of detail achieved in all sections is extremely impressive, and offers copious opportunities for the reader to explore their own interests or develop new lines of enquiry. There is a recognition in the first sentence of Victor Hoffbrand's introduction that people will come to the collection and the book from a number of angles: ceramic history with an interest in the jars, their designs and the potteries that manufactured them; medicinal ingredients and the therapies used in the seventeenth and eighteenth centuries, particularly plant-based medicines; apothecaries and their practices in this period. The challenge is therefore to meet these overlapping needs.

The book has three introductory sections. 'Delftware production and potteries' provides an overview covering the potteries, their associated designs, marks found on the jars, collections of jars across the world, and common shapes and sizes of jars. The references to other publications, particularly in the piece on potteries, are extremely useful to enable the reader to take these topics further. 'Designs' takes the reader through the common decorative features found on 17th and 18th century jars, important because these features are used to date the jars and also to try to tie them to specific places of manufacture. 'The Apothecaries' gives an introduction to the history of the apothecaries and biographies of those that appear to have initials on Hoffbrand jars and so were their most likely owners. There are also tables showing quantities and survival of jars of the differing design types with dates and/or initials, and also designs on dated jars.

These introductory sections are packed full of information. The 'Designs' section gives incredibly detailed descriptions of each design type and its subgroups representing an amazing level of observation and subsequent deductions about chronology and place of manufacture drawn from these observations. However, it seems a shame that there are no images next to the descriptions to make it easier to examine the features described. In fact there are only three small images in the first 30 pages, although it more than makes up for it after that. This reviewer had two bookmarks on the go to move backwards and forwards between the descriptions and the related images in the catalogue section. The level of detail without supporting images may

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be rather overwhelming for those unfamiliar with the collection or delftware drug jars more generally. The lack of reference to catalogue numbers in 'The Apothecaries' section also seems to be a missed opportunity for readers to tie the initials on the pots with the individual biographies.

The main catalogue section is titled 'The Collection' and presents striking photos of individual jars on a black background with the expected associated information: description, date, dimensions, 'product of' with a suggestion of a specific pothouse that made the pot in many instances, 'design' with detail of unusual features or variations on main design types, inscription, expanded inscription and 'contents' given as an English translation or interpretation of the inscription. Where initials appear on a jar, an attribution is given to the most likely apothecary. Provenance is also provided when available for previous ownership. Publication references are comprehensive, although could be slightly cryptic if you are not familiar with the sources. For example 'Not in Lipski and Archer (1984)' may seem like a strange comment unless you know that Lipski and Archer's work is on *dated* delftware jars and so finding a dated one in a collection that does not feature warrants a mention. Similarly 'This jar is not in Lipski and Archer (1984) but would be jar 1627C' shows a knowledge of the intricacies of the designs that is beyond the casual reader.

Humphries' delight in the jars is evident in his playful description of the designs, such as a description of an angel's face as 'rather resembling the composer Beethoven' (cat. 40) or the description of a series of angels in a design as 'Bet style' referring to the beehive hairstyle of the Coronation Street character Bet Lynch. The photographs in the catalogue are all taken straight onto the jars, which is generally what you want to see, but it means no image of the early 'pipe smoking man' featured at the end of the cartouches and no sense of the profile of the syrup or oil jars. It would also have been great to have images of some of the details mentioned in the descriptions such as the jar that has a sketch of 'possibly a maypole' on the foot (cat. 26).

Commenting on errors in the decoration on specific jars is very effective in reminding the reader that each jar was created by an individual craftsmen who might make mistakes. For example, nerve ointment was rendered as U:MERVIN rather than U:NERVIN (cat. 117) and a dry drug jar was labelled S for syrupus (syrup) when it should be U for unguentum (ointment) (cat. 118). A significant part of the jars' appeal is that they are so obviously created and decorated by hand.

The section on 'Contents: The medicines, their ingredients and uses' by Henry Oakeley is equally impressive in its attention to detail and grounding in thorough research. Entries for each substance stored in a jar are provided in alphabetical order with contemporary references, uses and occasional commentary. Quotations from contemporary sources give a sense of the historical period and there is a pleasingly light touch in terms of explanation of unfamiliar terms and provision of context.

Again the author's enjoyment of the subject matter shines through, for example in the entry for Conserve of Clove Gillyflowers which Culpeper claims 'provoke lust.' Oakely has simply added 'An interesting selling point.' This section could successfully stand alone as an extremely useful glossary of seventeenth and eighteenth century remedies and medicinal plants. They are tied to the jars in the preceding section simply with catalogue numbers which again leaves the reader with to-ing and fro-ing between the jars and their contents which is slightly cumbersome. The text is interspersed with lovely woodcut illustrations primarily of plants, but also a gorgeous one of swallows from Matthiolus's *Discorsi* (1568). Enjoyment of the image is definitely tarnished by the recipe below for Oil of Swallows revealing that they were incorporated whole and alive into the mixture.

The book ends with a series of bibliographies (jars and medicines given separately), appendixes and indexes (of jars; people, places, designs). The appendixes are a short glossary of pharmaceutical terms; a very useful list of biographies of physicians and apothecaries that are referred to in attributions for recipes; and a thorough glossary of 'materia medica etc modern names' which gives ingredients, predominantly plant names, used for remedies in the jars cross-referenced with modern botanical name and/or Latin name for substances translated.

For the delftware drug jar aficionado this is a very welcome and enjoyable addition to the relatively limited number of recent publications on the subject. For someone new to apothecary pots or looking for an introduction to an aspect of jars or their contents, the level of scholarship will impress and the level of detail should not be viewed as off-putting. The publication will hopefully provide increased momentum for a long-overdue book to accompany the Wilkinson Collection, the largest English delftware drug jar collection, and also for further research into the jars as a fascinating insight into the medicinal substances used in the period. Although Henry Oakeley admits 'all those who took them are now dead (at least because of the passage of time)' the jars allow an appreciation of their medical concerns and remedies.

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